A DISSERTATION

ON

"COMPARATIVE STUDY OF OPEN MESH REPAIR AND DESARDA'S NO-MESH REPAIR FOR INGUINAL HERNIA, IN GMKMCH, SALEM."

For a period of 2 years

Submitted to

THE TAMILNADU DR. M. G. R UNIVERSITY
CHENNAI

In partial fulfilment of the regulations
for the award of

M.S DEGREE IN GENERAL SURGERY
BRANCH I

GOVERNMENT MOHAN KUMARAMANGALAM

MEDICAL COLLEGE, SALEM

APRIL 2016

Government Mohan Kumaramangalam Medical College Hospital

SALEM

DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation titled **"COMPARATIVE STUDY OF OPEN MESH REPAIR AND DESARDA'S NO-MESH REPAIR FOR INGUINAL HERNIA, IN GMKMCH, SALEM"** is a bonafide and genuine research work carried out by me under the guidance of **Dr.K.SANTHI.M.S., Professor**, Department of General surgery, Government Mohan Kumaramangalam Medical College Hospital, Salem, Tamil Nadu, India.

Date: 28-09-2015

Signature of the Candidate

Place: Salem

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CERTIFICATE BY THE GUIDE

This is to certify that this dissertation "**COMPARATIVE STUDY OF OPEN MESH REPAIR AND DESARDA'S NO-MESH REPAIR FOR INGUINAL HERNIA, IN GMKMCH, SALEM**" is a bonafide work done by **Dr. PRAKASH** in partial fulfillment of the requirement for the degree of M. S. in General Surgery, examination to be held in 2016.

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I specially thank all my patients without whose cooperation; this dissertation would never have seen the light of the day.

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Ethical Committee Meeting held on 08.01.2015 at 11.00 A.M in the Seminar Hall, IInd Floor, Medicine Block, Govt. Mohan Kumaramangalam Medical College Hospital, Salem 01.

The following Members were attended the Meeting.

MEMBERS:

1. Dr. N. Mohan, MS.,FICS.,FAIS.,FMMC., Dean, Govt. Mohan Kumaramangalam Medical College, Salem.
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Sl. No.	Name of the Presenter with Address	Title	Name of the Guide and Address	Whether it is Approved or not.
1.	Dr. Prakash, II year MS., P. G.Student, GMKMC, Salem – 30.	Comparative study of lichen stein's mesh repair and desarda's no-mesh repair for inguinal hernia in GMKMCH, Salem during Sep 2013-Sep2015	Dr. K. Santhi, MS., Associate Professor of General Surgery, G MKMC, Salem.	Approved

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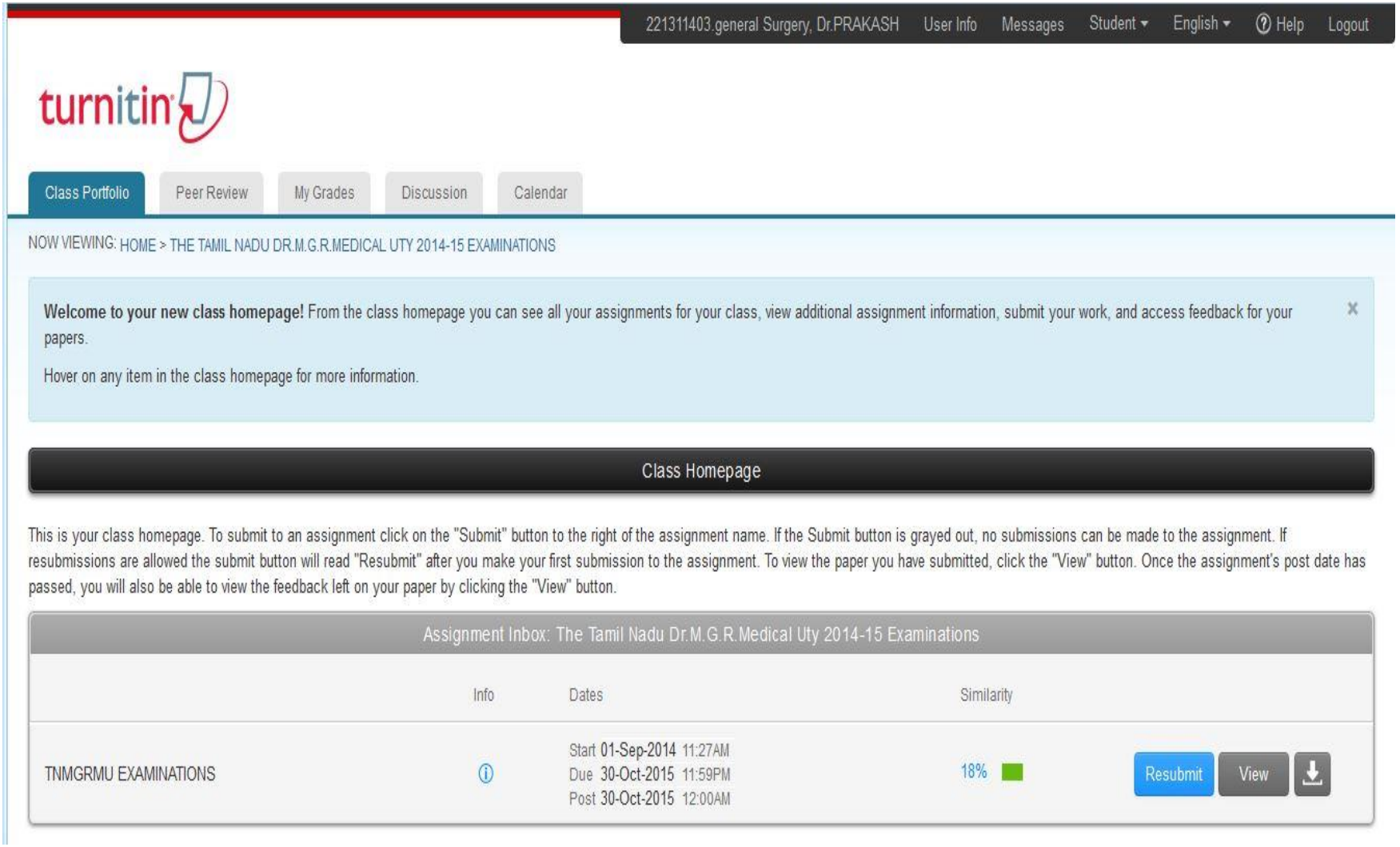
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ABSTRACT

BACKGROUND AND OBJECTIVES:

Inguinal hernia is the most common among the hernias. The best treatment modality of it is primarily surgical. Improvements in surgical techniques of inguinal hernia repair have significantly improved the outcomes for patients.

The success rate of hernia surgeries is mostly noted by its permanence, amount of complications, cost effectiveness, and duration to return to normal activity.

Though mesh repair has gained popularity among the surgical repair of hernias, it has certain limitations like availability of mesh, cost, learning curve and complications associated with it.

Hence this study is being carried out to compare the effectiveness of Desarda's no mesh repair, a newer cost effective method, with the existing Lichtenstein's tension free repair, and to decide on a better treatment for inguinal hernia repair based on the results of this study.

Methodology:

SOURCE OF DATA :

The study was carried out in Government Mohan Kumaramangalam Medical College Hospital, Salem, over a period of 2 years.

Study design : prospective study

A total of 60 cases diagnosed to have inguinal hernia were included in the study fulfilling the inclusion and exclusion criteria. 30 patients were randomly subjected to Desarda's technique and 30 patients underwent Lichtenstein's repair

METHODS OF COLLECTION OF DATA:

Data for the proposed study was collected in a pretested proforma which included various parameters like type of hernia, duration of symptoms, type of hernia.

Detailed history and physical examination were done.

After surgical interventions, patients were followed up and noted for complications like Groin pain, Surgical site infections, Duration of hospital stay, Duration to return to normal activity

RESULTS:

There was no significant differences regarding age, sex, type of hernia, duration of hernia in both the groups. The operation time was 49 minutes in Desarda's group and 54 minutes in the Lichtenstein group which was considered highly significant ($p<0.01$). Over a period of two year follow-up there were no recurrences in both the groups. There were no surgical site infections in the Desarda's group when compared to Lichtenstein's repair where there were 3 (10%) cases. The occurrences of other complications like Loss of sensation over the groin, Scrotal edema, abdominal wall stiffness were not seen in Desarda's group, whereas its occurrence was highly significant ($p<.01$) in Lichtenstein's group. The mean hospital stay was 4days in Desarda's group while it was 6days in the Lichtenstein group in those patients who were hospitalized.

CONCLUSION:

Desarda's repair is a physiologically sound, easy to learn and simple method when compared to other tissue repair techniques and requires no mesh.

It can be performed under local anesthesia when patient is unfit for Regional/General anesthesia and is associated with a less duration of surgery and less mesh associated postoperative complications, with a rapid recovery time.

It can be used in contaminated surgical fields in young individuals, and during financial constraints.

Hence, Desarda's no mesh repair is favorably comparable with Lichtenstein's mesh repair.

To conclude, Desarda's no mesh repair, when compared to Lichtenstein's mesh repair produces same or better results.

Large scale study and long term follow up may be needed to identify recurrences.

INDEX

LIST OF ABBREVIATIONS:-

1)	TAPP	:	Transabdominal Preperitoneal repair
2)	TEP	:	Totally extraperitoneal repair
3)	IPOM	:	Intraperitoneal onlay mesh repair
4)	ASIS	:	Anterior superior iliac spine
5)	COPD	:	Chronic Obstructive Pulmonary Disease
6)	TF	:	Transversalis Fascia
7)	IO	:	Internal oblique muscle
8)	IL	:	Inguinal ligament
9)	EOA	:	External oblique aponeurosis

LIST OF TABLES

INTRODUCTION

A hernia is defined as protrusion of whole or a part of a viscus through the wall that contains it[(1)]. It is an area of weakness or complete disruption of fibromuscular tissues of the body wall, through which structures arising from the cavity contained by the body wall can pass through or herniate [(3)]

Inguinal hernia is the most commonly seen condition in the outpatient department in most parts of the world.

Improvements in surgical technique and a better understanding of the anatomy and physiology of the inguinal canal have significantly improved outcomes for many patients[(2)]

The various surgical techniques of inguinal hernia repair are

i) Open techniques:

Tissue repairs:

1. Shouldice repair
2. Mcvay repair
3. Bassini's repair

Prosthetic repairs:

1. Lichtenstein's tension free repair
2. Plug and patch technique
3. Prolene hernia system
4. Stoppa's technique

ii) Laparoscopic approach

1. Transabdominal Preperitoneal repair (TAPP)
2. Totally extraperitoneal repair (TEP)
3. Intraperitoneal onlay mesh repair (IPOM)

The choice of a method depends on the surgeon; however, the ideal method for modern hernia surgery should be simple, cost effective, safe, tension free and permanent [(12)].

Despite the various modalities available for treatment of this common condition, no surgeon has ideal results. Complications like postoperative pain, nerve injury, infection, and recurrence continue to pose a challenge to surgeons.

This necessitates the introduction of a new technique of hernia repair with reduced complication rates.

The Desarda's technique of inguinal hernia repair is an improvement as it overcomes the challenges faced with the use of the tension tissue-repair and mesh repair techniques. It is based on the concept of providing a strong, tension-free and physiologically dynamic posterior inguinal wall [(10)].

This study visualizes two modalities of hernia repair:

The Lichtenstein tension free repair,

The Desarda's no mesh technique

and compares the efficacy and complication rates associate with them.

AIM OF THE STUDY

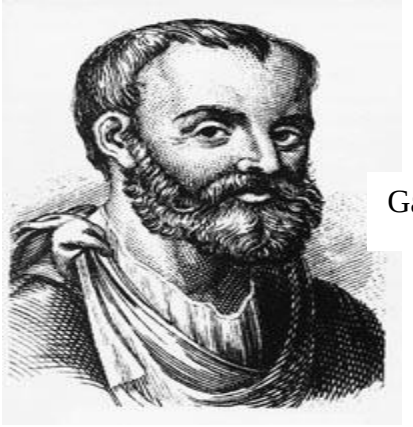
1) To assess and compare the efficacy of Desarda's no mesh repair over Lichenstein repair for the treatment of inguinal hernia.
2) To compare the complications associated with both the modalities of treatment.
3) To decide on the better treatment for inguinal hernia based on the findings of the study.

REVIEW OF LITERATURE

Hernia (Greek kele/hernios--bud or offshoot) was present in the human history from its very beginning. The treatment of groin hernia can be divided into five eras [15]

1. **GREEKO-ROMAN TIMES:**

   - In Hippocratic Corpus it has been stated that hernia was caused by drinking water from large rivers [23], or experiencing a traumatic event to the belly [24].



Galen (130-200)

   - Galen (130-200), attributed hernias to the rupture of the Peritoneum or overstretching of the overlying muscles and fasciae [25]. He treated it with ligation of the hernia sac, along with the spermatic cord, and removal of the testis [25]

2. **MIDDLE AGES:**

   - Paul of Aegina modified Galen's method by not removing the testis. He instead opened the sac of the hernia and reduced its content into the

abdominal cavity, or cauterised the skin above the hernia, thinking that scar tissue will form over the overstretched peritoneum [26]

- The Arab method of cauterising the pubic region was increasingly used in the western late Middle Ages
- But Surgeons in the late Middle Ages did not prefer surgery as the line of management. Hence the method of taxis by Roland of Parma (fl.1264) following Albucasis was popularized.

3. **RENAISSANCE:**

- Pierre Franco published the first article, mainly focused on herniotomy. His second publication '*Traité des hernies',* was published in 1561, where he elaborates the nature, etiology and treatment of inguinal hernia [27]
- Franco also was the first surgeon to operate on strangulated inguinal hernia

Ambroise Pare (1510-1590)

- Franco's work was referred and published by French surgeon Ambroise Paré (1510-1590) which was mainly focused on conservative management
-

4. 17TH CENTURY AND 18TH CENTURY:

- François Poupart (1661- 1709) in 1695 emphasized the importance of inguinal ligament involvement in the pathology of inguinal hernia [28].
- 18th century was considered the era of anatomists, during which Giovanni Lancisi (1654-1720), Petrus Camper (1722-1789), Antonio de Gimbernat (1734-1790) [29] gave descriptions of the anatomical structures in relation to inguinal hernia.

August Gottlieb Richter (1742-1812)

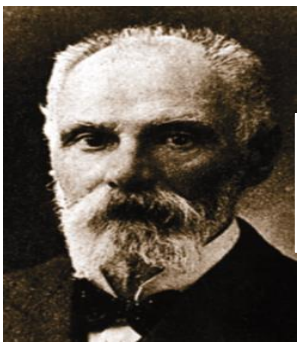
- August Gottlieb Richter (1742-1812) described a strangulated hernia involving only part of the intestine [29]

5. 19TH CENTURY AND 20TH CENTURY:

- Many important anatomical structures were introduced by Antonio Scarpa (1752-1832) and Franz Kaspar Hesselbach (1759-1816).

Sir Astley Paston Cooper
(1768-1841)

- Sir Astley Paston Cooper (1768-1841) described the pectineal ligament and its relation to inguinal hernias, and was hence named after him.



Eduardo Bassini
(1844-1924)

- Surgically, 19th century saw a breakthrough in inguinal hernia repair with Italian surgeon Eduardo Bassini (1844-1924) who described the technique of posterior wall strengthening [30].
- Albert Narath (1864-1924), Georg Lotheissen (1868-1935), Chester McVay (1911-1987) introduced a new method of posterior inguinal wall repair using the pectineal ligament of Cooper.

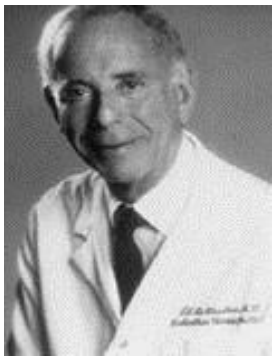
20TH CENTURY:

Earle Shouldice

(1891-1965)

- Canadian surgeon Earle Shouldice (1891-1965) described a technique modifying Bassini's repair, which involved a four layered reinforcement of posterior inguinal wall with continuous sutures [31]
- Lloyd Nyhus classified hernias

TENSION FREE REPAIR:



Irving Lichtenstein

(1920-2000)

- Though it was introduced by Albert Narath (1864-1924) who used silver filigiree and Francis Usher (1908-1980) who used polypropylene, tension free concept got its breakthrough with Irving Lichtenstein (1920-2000) who used a prosthetic material to bridge the gap between the ligaments and muscles [32]

POSTERIOR INGUINAL APPROACH:

- A totally extraperitoneal approach was first executed by Cheatle in 1920, as a method inguinal and femoral hernia repair through a lower mid abdominal preperitoneal approach.

René Stoppa
(1921-2006)

- -René Stoppa (1921-2006) in France modified this technique and described the placement of prosthetic through an open preperitoneal approach [33], in the preperitoneal space.

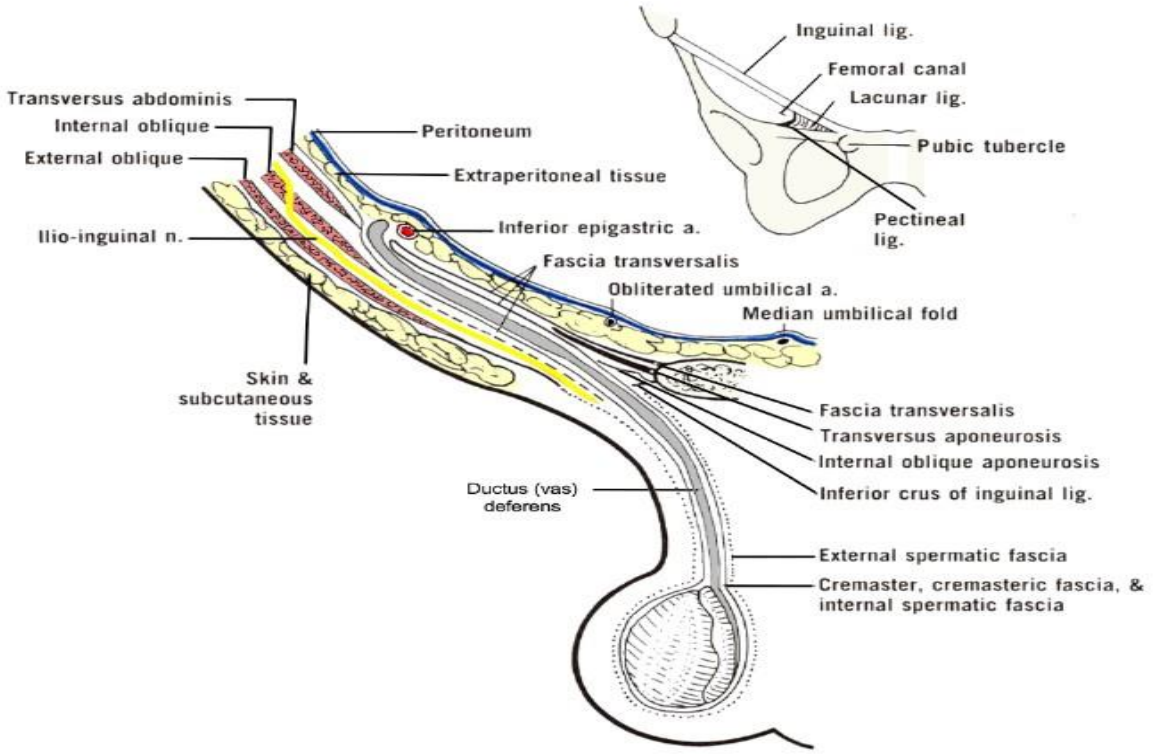
LAPAROSCOPIC INGUINAL HERNIA REPAIR [34]:

A number of publications were introduced in the early 1990's indicating an increased possibility of laparoscopic inguinal hernia repair.

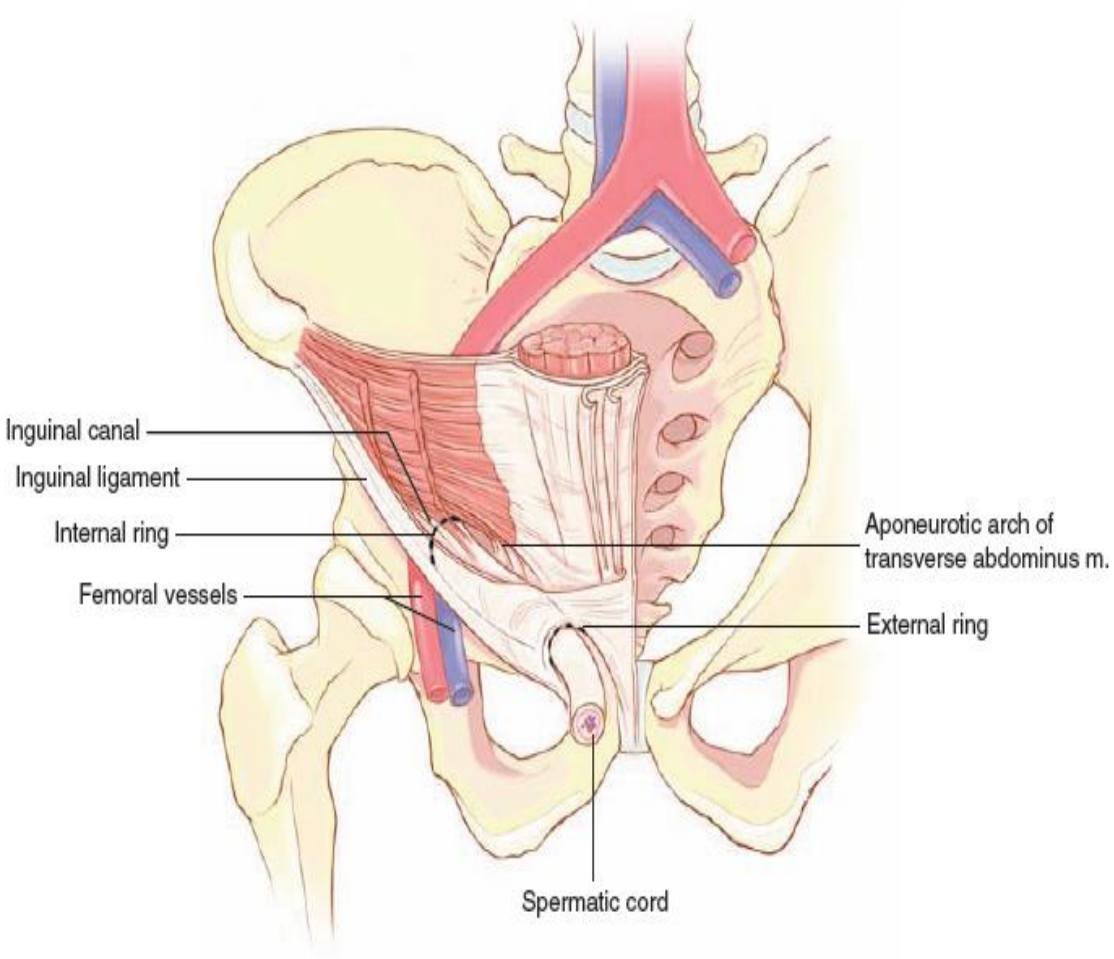
Initial methods introduced were:

- IPOM (IntraPeritoneal Onlay Mesh repair)
- TAPP (TransAbdominal PrePeritoneal approach)
- Totally Extra Peritoneal approach was introduced during 1992-1993

ANATOMY

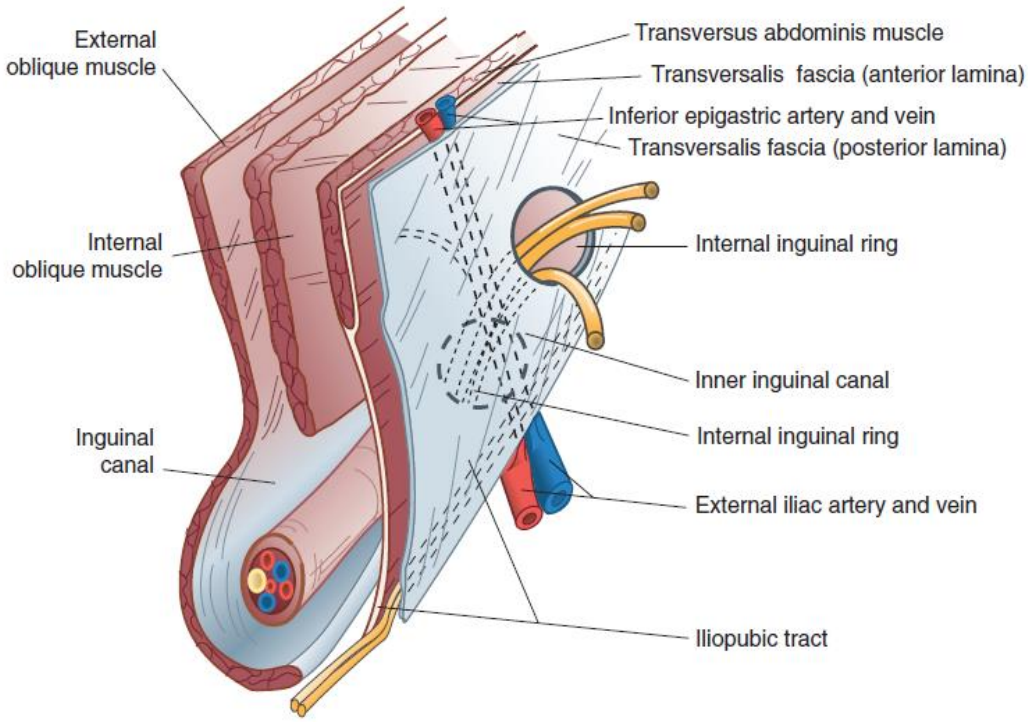


The length of the inguinal canal measures 4-6cm, and is shaped like a cone. It is located in the anterior portion of the pelvic basin, lying just above the inner half of the inguinal ligament [(2)] The canal begins in the posterior abdominal wall, with its lateral end being the internal inguinal ring, and the medial end the subcutaneous external ring.



The internal (deep) ring is a defect in the transversalis facia, located midway between the anterior superior iliac spine and the symphysis pubis, just lateral to inferior epigastric artery. The external (superficial) ring is a triangular defect in the external oblique located above and lateral to the pubic crest.

BOUNDARIES OF THE INGUINAL CANAL



I) Anterior : External oblique

Internal oblique in the lateral third

II) Posterior : Fascia transversalis

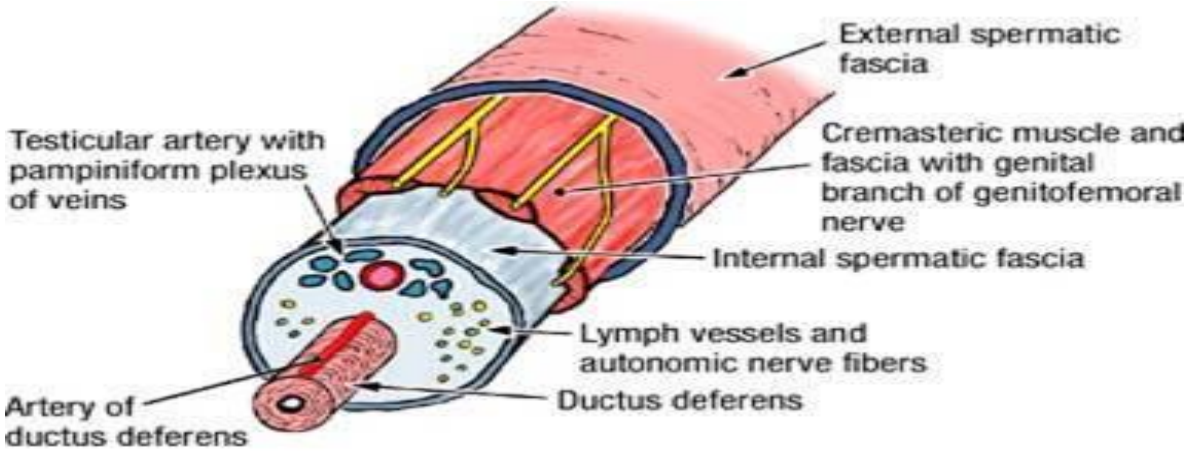
Transversus abdominis aponeurosis

Falx inguinalis in the inner half

III) Superior : Internal oblique muscle

IV) Floor : The upper surface of the inguinal ligament

CONTENTS OF THE INGUINAL CANAL:



I) In Male:

a) Spermatic cord:

i) Vas deferens

ii) Testicular artery

iii) Artery to Vas

iv) Cremasteric artery

v) Pampiniform plexus of veins

vi) Genital branch of genitofemoral nerve

vii) Sympathetic nerve fibers

viii) Lymphatics

ix) Remnants of processus vaginalis

b) Ilioinguinal nerve

II) In Female

a) Round ligament of uterus

b) Ilioinguinal nerve

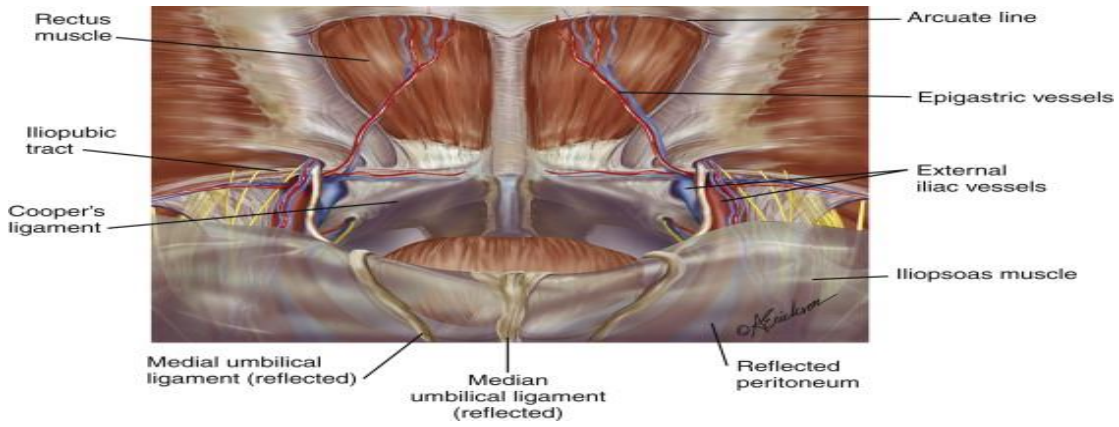
Other structures related to the inguinal canal are:

1. Iliopubic tract
2. Lacunar ligament
3. Cooper's ligament
4. Conjoint tendon

1. Iliopubic tract:

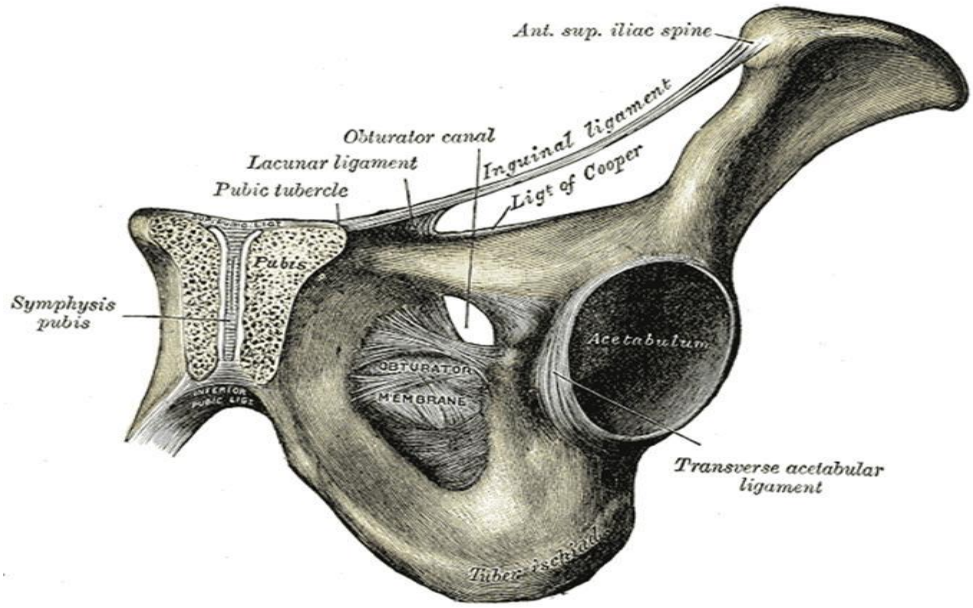
- It forms the inferior margin of the internal inguinal ring
- It begins at the ASIS and inserts into cooper's ligament
- The shelving edge of the inguinal ligament connects

iliopubic tract to inguinal canal.



2. Lacunar ligament of Gimbernat:

    - The inguinal ligament fans out like a triangle near its attachement to the pubic tubercle
    - This is known as the Lacunar ligament of Gimbernat



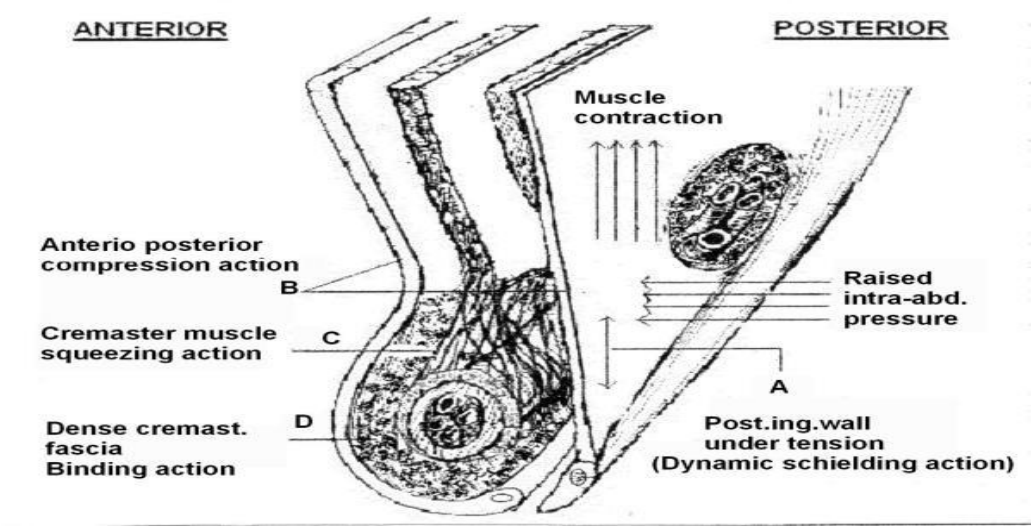
3. Cooper's Ligament:

    - Lacunar ligament continues laterally over the periosteum of the pubic crest as the cooper's ligament

4. Conjoint tendon:

    - The inferior fibers of internal oblique muscle and the aponeurosis of the transverse abdominis muscle fuses to form the conjoint tendon near their insertion at the pubic tubercle.

DEFENCE MECHANISM OF INGUINAL CANAL:



1. Obliquity of inguinal canal.
2. Arching of conjoint tendon.
3. 'Shutter mechanism' of internal oblique [(22)]
4. 'Ball valve mechanism' due to contraction of cremaster muscle which plugs to superficial ring.
5. 'Slit Valve mechanism' due to opposition of intercrural fibres of superficial ring when the external oblique muscle contracts.

INGUINAL HERNIA

EPIDEMIOLOGY:

- Of all the abdominal hernias, groin hernias are most common, accounting for 75% of the total [3]
- Of all groin hernias, 95% are inguinal hernias and the rest are femoral hernias
- The incidence of inguinal hernias and the associated complications are seen in extremes of age

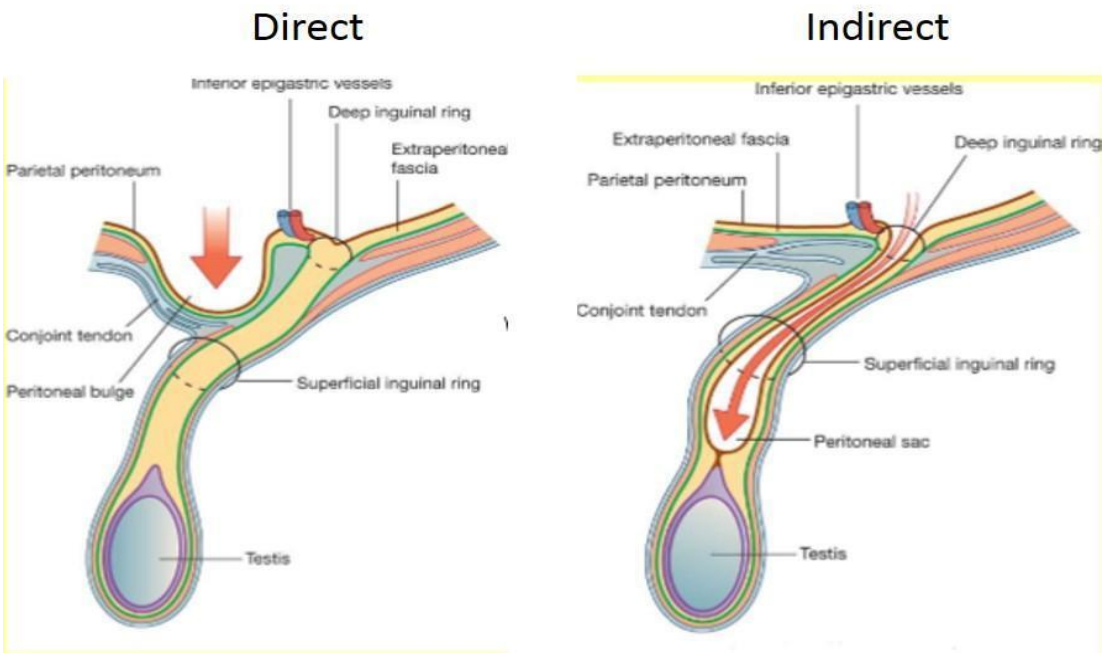
CAUSES OF GROIN HERNIATION [2]

1. Smoking / Coughing / COPD
2. Obesity
3. Straining : Constipation/Prostatism
4. Pregnancy
5. Birth weight < 1500g
6. Family history
7. Valsalva manouevre / Heavy lifting / Physical exertion
8. Ascites
9. Connective tissue disorders / Collagen synthesis abnormalities
10. Post appendicectomy- iliohypogastric nerve injury

CLASSIFICATION OF INGUINAL HERNIA:

ANATOMIC CLASSIFICATION [4]

This classification is based on the location of the hernia in relation to the inferior epigastric artery



1. Direct Inguinal Hernia : Medial to inferior epigastric artery
2. Indirect Inguinal hernia : Lateral to inferior epigastric artery

OTHER CLASSIFICATIONS:

1. NYHUS CLASSIFICATION [3] :

Type I
Indirect inguinal hernia—internal inguinal ring normal (e.g., pediatric hernia)

Type II
Indirect inguinal hernia—internal inguinal ring dilated but posterior inguinal wall intact; inferior deep epigastric vessels not displaced

Type III
Posterior wall defect
- **A.** Direct inguinal hernia
- **B.** Indirect inguinal hernia—internal inguinal ring dilated, medially encroaching on or destroying the transversalis fascia of Hesselbach's triangle (e.g., scrotal, sliding, or pantaloon hernia)
- **C.** Femoral hernia

Type IV
Recurrent hernia
- **A.** Direct
- **B.** Indirect
- **C.** Femoral
- **D.** Combined

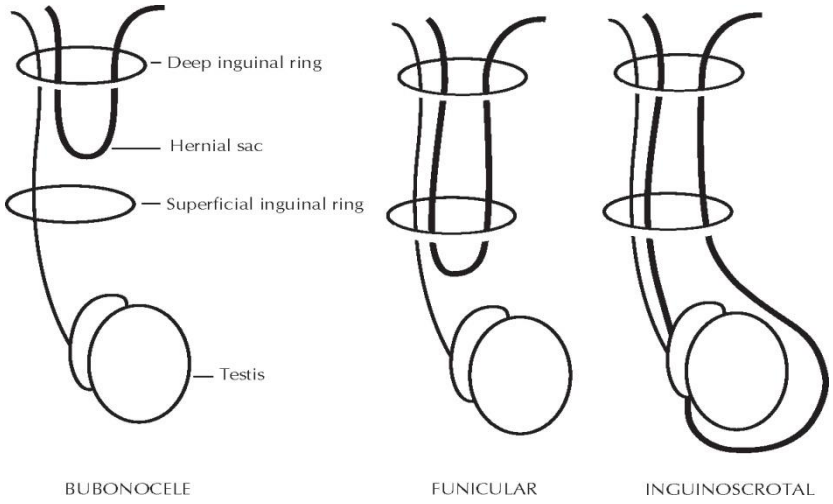
2. MODIFIED GILBERT'S CLASSIFICATION:

Type 1	Indirect inguinal hernia, tight internal ring through which passes a peritoneal sac of any size
Type 2	Indirect inguinal hernia, moderately enlarged internal ring that measures no more than 4 cm
Type 3	Indirect inguinal hernia, patulous internal ring of more than 4 cm
Type 4	Direct inguinal hernia, essentially the entire floor of the inguinal canal is defective
Type 5	Direct inguinal hernia, diverticular defect of no more than 1 cm or 2 cm in diameter
Type 6	Both indirect and direct inguinal hernia (Pantaloon hernias)
Type 7	Femoral hernia

INDIRECT INGUINAL HERNIA:

- It is the most common type of hernia (65%)
- More common in the younger age group and occurs on the right side.

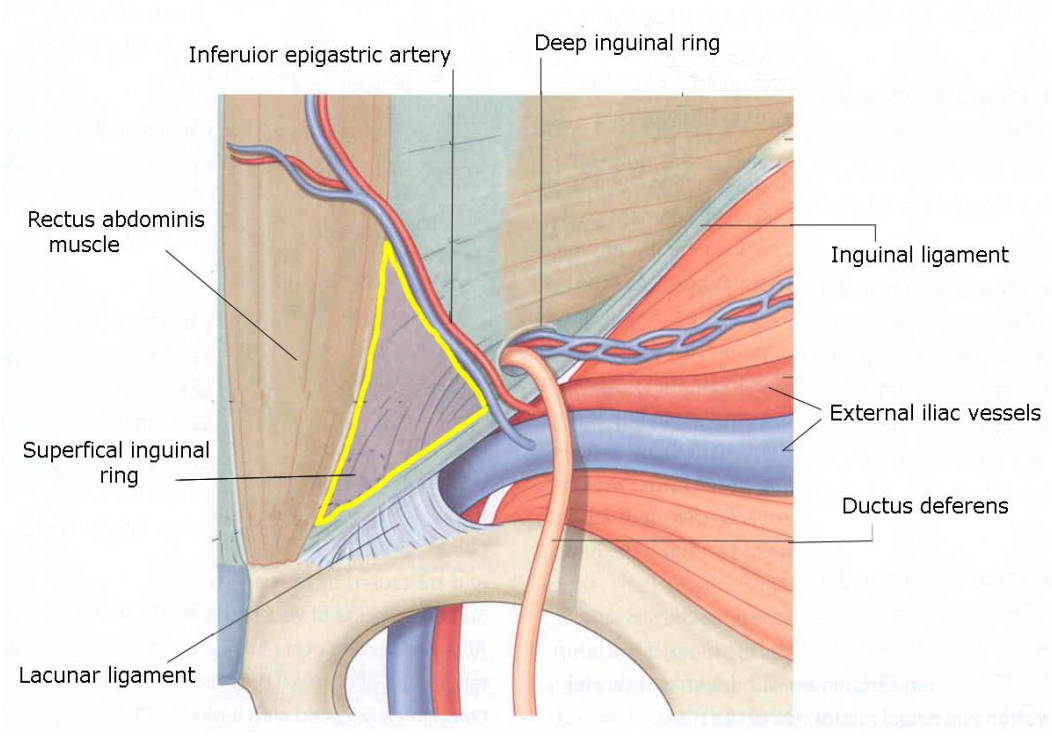
Types:



1) Bubonocele **:** Hernia is limited to the inguinal canal.
2) Funicular **:** The contents of the sac lie just above the testis and can be felt separately from the same.
3) Complete **:** It occurs in a congenital preformed sac, and the testis appears to lie within the lower part of the hernia

DIRECT INGUINAL HERNIA:

- 10-15% of hernias are direct
- 50% of direct hernias are bilateral
- It is uncommon in females and children
- It occurs mostly due to weakening of posterior wall of inguinal Canal



- Direct hernia occurs through the Hesselbach's triangle which is bound
    a) Laterally by inferior epigastric artery
    b) Medially by lateral border of rectus
    c) Below by inguinal ligament

COVERINGS OF INDIRECT INGUINAL HERNIA:

(from inside out)

1. Extraperitoneal tissue
2. Internal spermatic fascia
3. Cremasteric fascia
4. External spermatic fascia
5. Skin

COVERINGS OF DIRECT INGUINAL HERNIA:

(from inside out)

1. Extraperitoneal tissue
2. Fascia transversalis
3. Conjoined tendon
4. External spermatic fascia
5. Skin

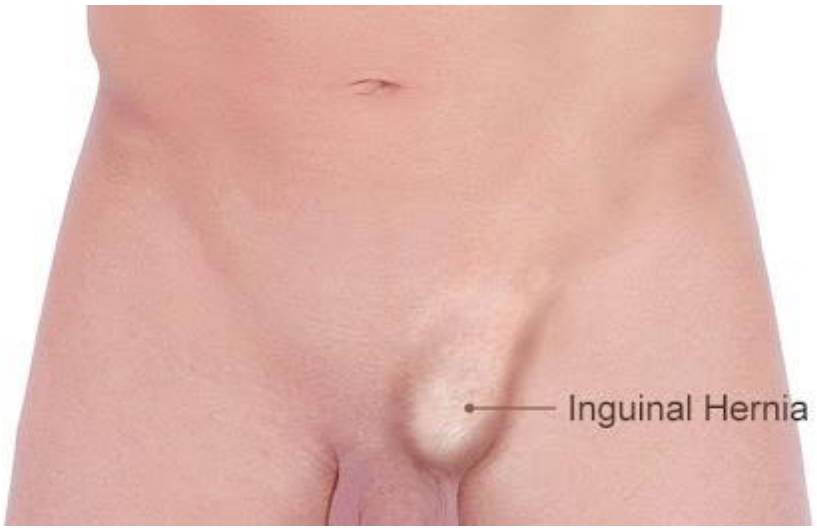
CLINICAL FEATURES :

- Inguinal hernias have a varied clinical presentation.
- The patient complains of swelling in the inguinal or inguino-scrotal region, which if not obstructed, will reduce in size on lying down, and increase in size on coughing.
- The patient also presents with dragging abdominal pain which worsens with prolonged standing.
- Clinical features indicating the precipitating factors ex: constipation /difficulty in passing urine, may be present.
- If complicated, the patient will present with features of obstruction or strangulation of bowel.
- Patient's history should contain
    - Duration of complaints
    - Reducibility
    - Precipitating events

PHYSICAL EXAMINATION [1]

- Physical examination is essential to the diagnosis of inguinal hernia [1].
- The patient should be examined in bright light, in standing position, and then in supine position exposing the groin and scrotum

  a) INSPECTION:



- The main goal of inspection is to identify abnormal bulge along the
- inguinal/scrotal region, and if present, to determine the character of the swelling.
- Inspection should also include checking for cough impulse and position ofthe penis.

b) PALPATION:

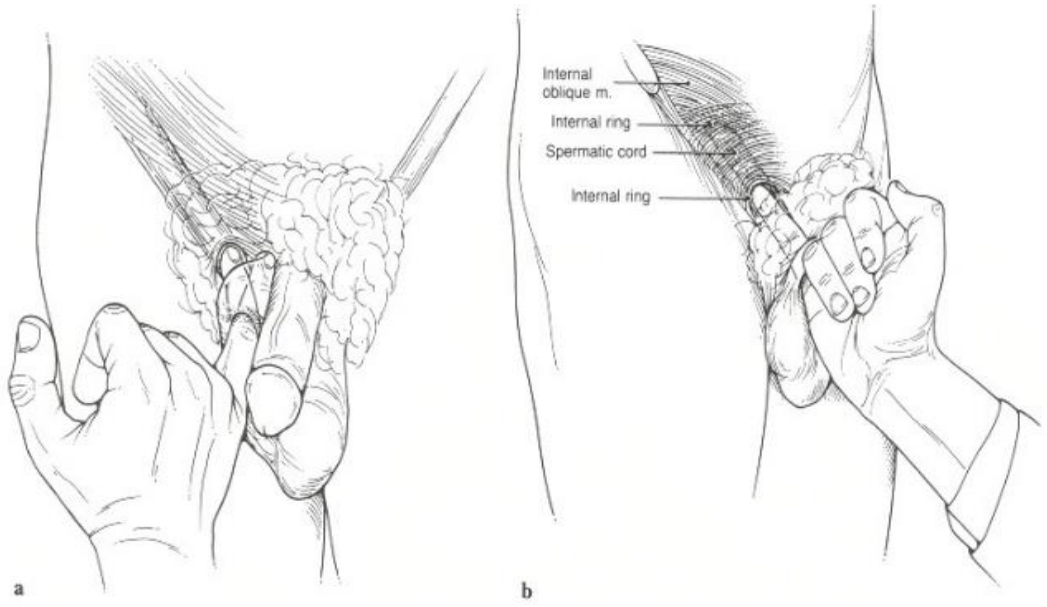
- The swelling is examined to know position, extent, temperature, tenderness, impulse on coughing, reducibility, ability to get above the swelling and consistency.
- Relation to the testis and spermatic cord should be noted.

Certain techniques have been used to distinguish direct and indirect inguinal hernias.

i) Ring occlusion test [(1)]

- The internal ring is located half an inch above mid-inguinal point.
- After reducing the contents, the patient is asked to lie down and the deep ring is occluded with the thumb
- The patient is asked to cough
- If the swelling appears medial to thumb, it is direct hernia
- If the swelling does not appear and appears only after releasing the thumb, it is indirect hernia

ii) Invagination test:



- After reduction of the hernia, the little finger is insinuated from the bottom of the scrotum, and is pushed up, to palpate the pubic tubercle and enter the external ring. The nail is against the spermatic cord and pulp will feel the ring.
- On coughing, the impulse is felt in the tip in case of indirect hernia and at the pulp in case of direct hernia.

iii) Zieman's test:

- It is a distinguished method to find out whether the case is one of direct, indirect (oblique) or femoral hernia
- The index finger is placed on the deep inguinal ring (1/2 inch superior to the mid-inguinal point), the middle finger on the external ring and the ring finger on the saphenous opening(4 cm below and lateral to the pubic tubercle).
- When the impulse is felt
    - At index finger : Indirect hernia
    - At the middle finger : Direct hernia
    - At the ring finger : Femoral hernia

Cough impulse will be absent in:

- Incarcerated hernia,
- Strangulated hernia,
- When the neck of the sac is blocked by adhesions

c) PERCUSSION: (Note its content).

- Resonant note : Bowel
- Dull note : Omentum or extraperitoneal fatty tissue

d) AUSCULTATION:

- Peristaltic sound may be audible in case of enterocele.

Examination of testis, epididymis, and the spermatic cord along with the abdominal wall and tone of abdominal muscles is mandatory to look for malgaigne's bulging.

e) PER RECTAL EXAMINATION:

-To look for prostatomegaly (in male) and any other precipitating factors.

f) OTHER SYSTEM EXAMINATION:

- Respiratory and circulatory system examination to rule out any other precipitating factors.

DIFFERENTIAL DIAGNOSIS [2]:

1. Malignancy:
    - Lymphoma
    - Retroperitoneal sarcoma
    - Metastasis
    - Testicular tumor
2. Primary testicular
    - Varicocele
    - Epididymitis
    - Testicular torsion
    - Hydrocele
    - Ectopic testicle
    - Undescended testicle
3. Lymph node
4. Sebaceous cyst / Hidradenitis
5. Cyst of the canal of Nuck (female)
6. Psoas abscess
7. Hematoma
8. Ascites

INVESTIGATIONS[2]:

- The diagnosis of hernia is mainly clinical.
- Apart from the routine blood investigations, History and physical examination is adequate to diagnose hernia, but imaging studies are used as adjuncts.
- Ultrasonography is the least invasive technique, which helps in delineating anatomical structures. Valsalva maneuver is performed and bulging out of the abdominal contents through the hernia orifice is noted.
- The static images produced by the CT and MRI are helpful to exclude confounding differential diagnosis. They are also used in cases where USG is inconclusive

TREATMENT:

- Elective Surgical repair is the definitive treatment of inguinal hernia.
- Emergent inguinal hernia repair is indicated when there is impending compromise of the vascularity of the hernia contents

Surgical treatment comprises of:

1. Open approach
2. Laparoscopic approach

OPEN APPROACH:

Open inguinal hernia repairs are classified into techniques that use prostheses to create a tension-free repair and those that reconstruct the inguinal floor using native tissue.

Tissue repairs are indicated when the use of prosthetic material is contraindicated such as contamination or strangulation where the prosthesis can get infected.

General principles in open techniques:

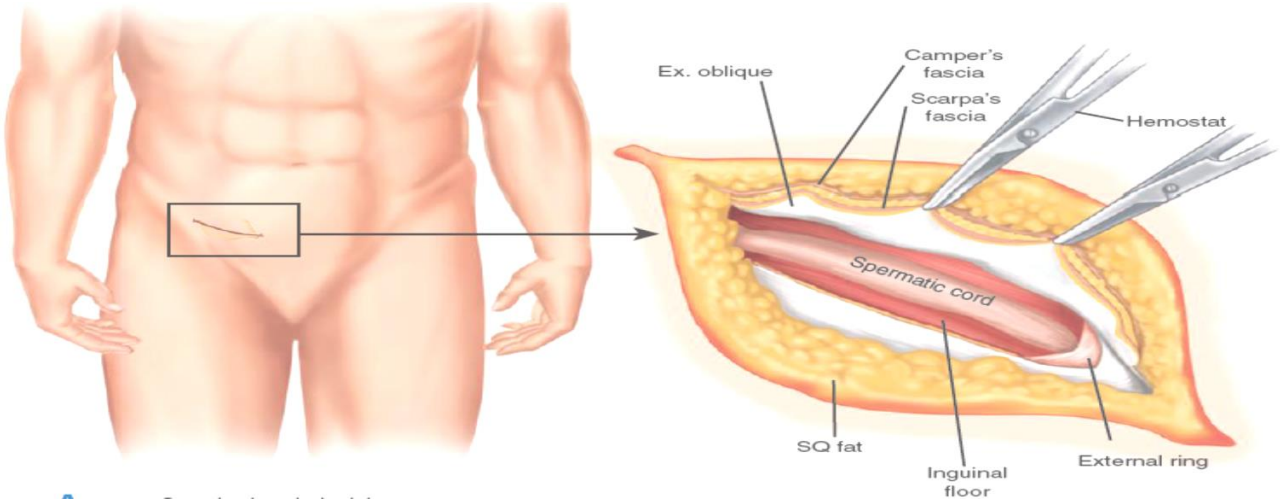
i) Anesthesia:

-Field block

-Ilioinguinal nerve block

-Regional block may be employed.

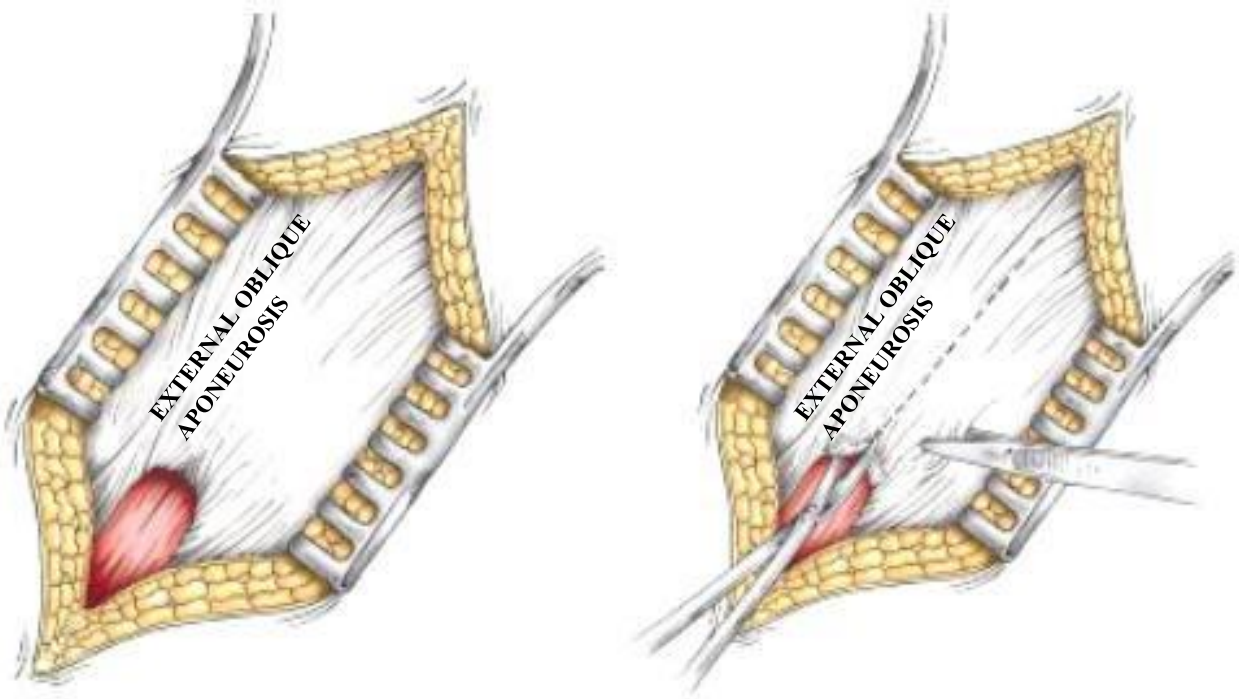
ii) Initial steps of surgery:



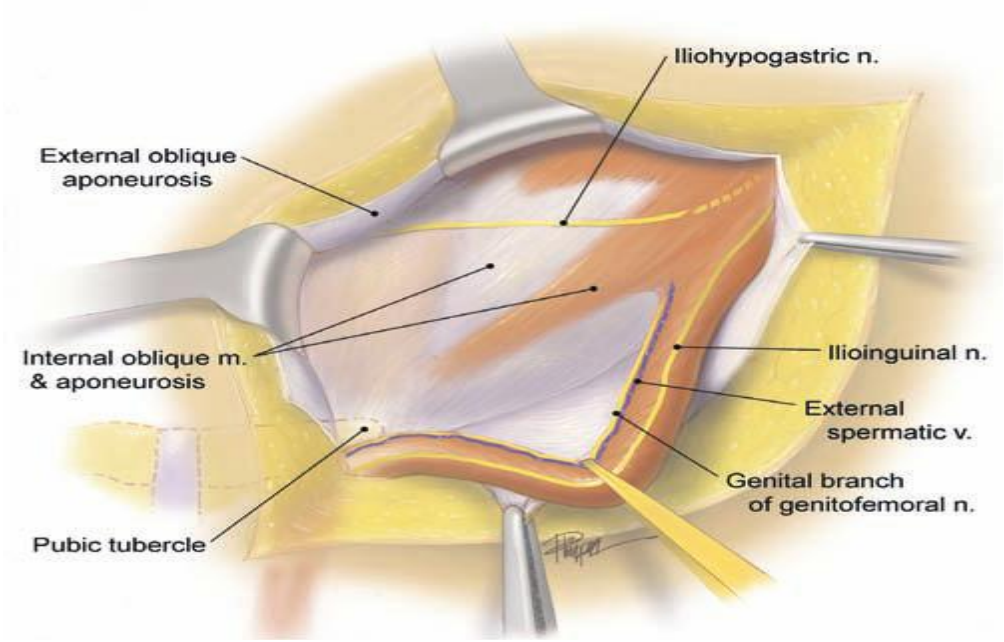
Incision:

- An oblique or horizontal incision is made over the groin
- The incision begins two finger breadths inferior and medial to the anterior superior iliac spine. It is then extended medially for approximately 6-8 cm

Dissection:

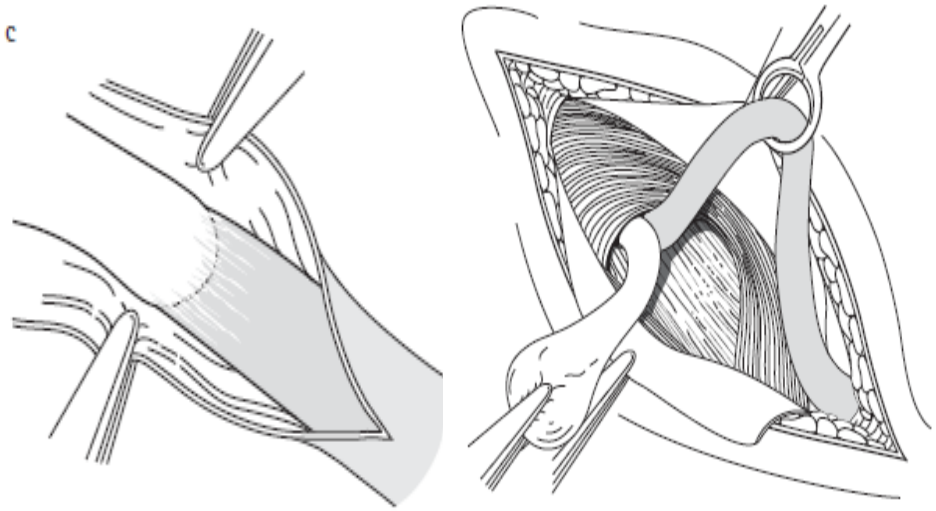


- The subcutaneous tissue is dissected using electrocautery.
- Scarpa's fascia is divided to expose the external oblique aponeurosis.
- A small incision is made in the external oblique aponeurosis parallel to the direction of the muscle fibers.
- External oblique aponeurosis is incised superior to the inguinal ligament, splitting the superficial ring.

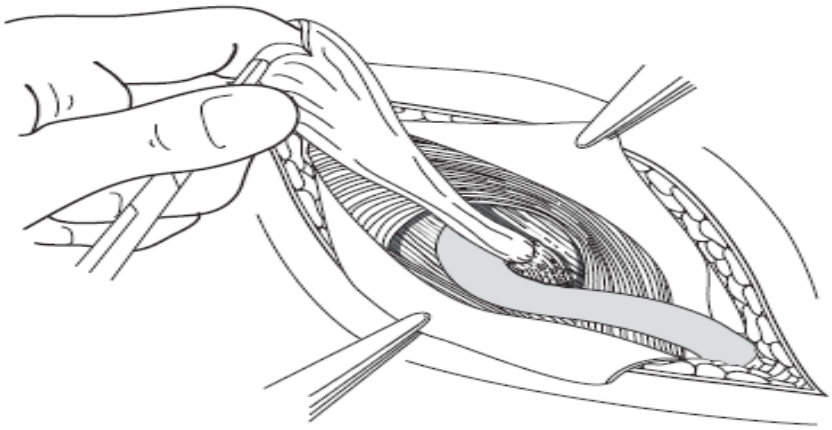


- The flaps of the external oblique aponeurosis are elevated.
- The interior oblique fibers are dissected bluntly from the overlying external oblique flaps.
- The inferior flap is dissected to expose the inguinal ligament, which is the reflected part of external oblique aponeurosis
- The ilio-inguinal and ilio-hypogastric nerves are identified and preserved.
- The pubic tubercle is identified and the cord structures are atraumatically dissected off of the pubis, encircled, and elevated

Hernial Sac Identification:



- The relation of an indirect sac is usually anterolateral to the spermatic cord, after division of the cremasteric muscle in the direction of its fibers.
- The posterior wall of the inguinal canal is assessed for direct hernias.
- The cord structures are separated from the sac which is typically identified by its pearly white glistening.



- The sac can then be grasped with a tissue forceps and bluntly dissected from the cord.

- The dissection is carried proximally toward the deep inguinal ring.
- Sac is opened and the viable contents may be reduced into the peritoneal cavity.
- The sac may be transfixed and excised at the internal inguinal ring or inverted into the preperitoneum.
- The inguinal canal is reconstructed, either with native tissue or with prostheses.

Various techniques in Open Approach:

Tissue repairs:

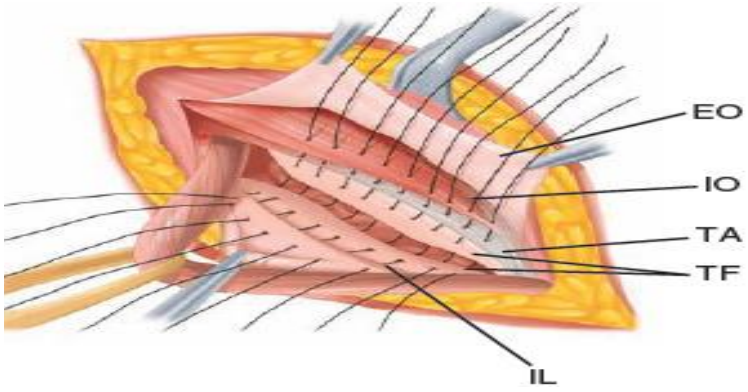
1. Bassini's repair
2. Shouldice repair
3. Mcvay repair

Prosthetic repairs:

1. Lichtenstein's tension free repair
2. Plug and patch technique
3. Prolene hernia system
4. Stoppa's technique

TISSUE REPAIRS:

I) Bassini's Repair:



- The transversalis fascia is opened
- Reconstruction of the posterior wall by suturing

    a) The transversalis fascia (TF)

    b) The transversus abdominis muscle (TA)

    c) The internal oblique muscle (IO) medially

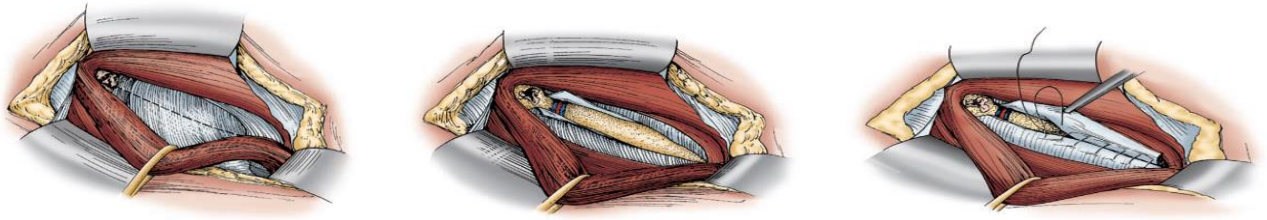
    d) To the inguinal ligament (IL) laterally.

Disadvantages:

- Longer duration of surgery
- Postoperative pain,
- Ecchymosis
- Scrotal edema
- Longer duration of hospital stay
- Recurrence rate: -9.6% recurrence rate with 5 years follow-up [12]

II) SHOULDICE REPAIR:

A) **B)** **C)**

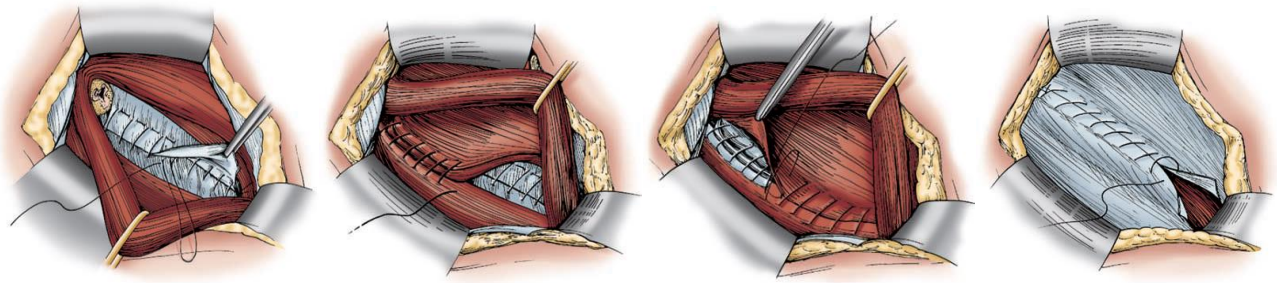


A).The transversalis fascia is being incised.

B). The upper and lower flaps of the transversalis fascia have been dissected free and elevated to expose the extraperitoneal fat and the inferior epigastric vessels.

C).The first layer of the Shouldice operation

D) **E)** **F)** **G)**



D). The second layer.

E). The third layer.

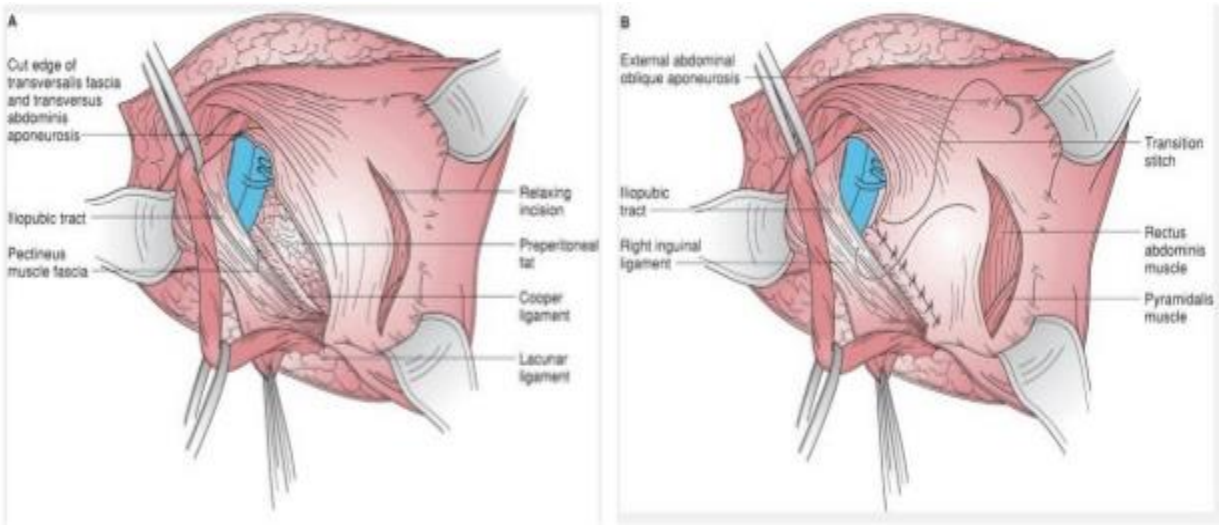
F). The fourth layer.

G). The external oblique aponeurosis has been repaired anterior to the spermatic cord.

- Recurrence Rate : 1- 4.5% [20]

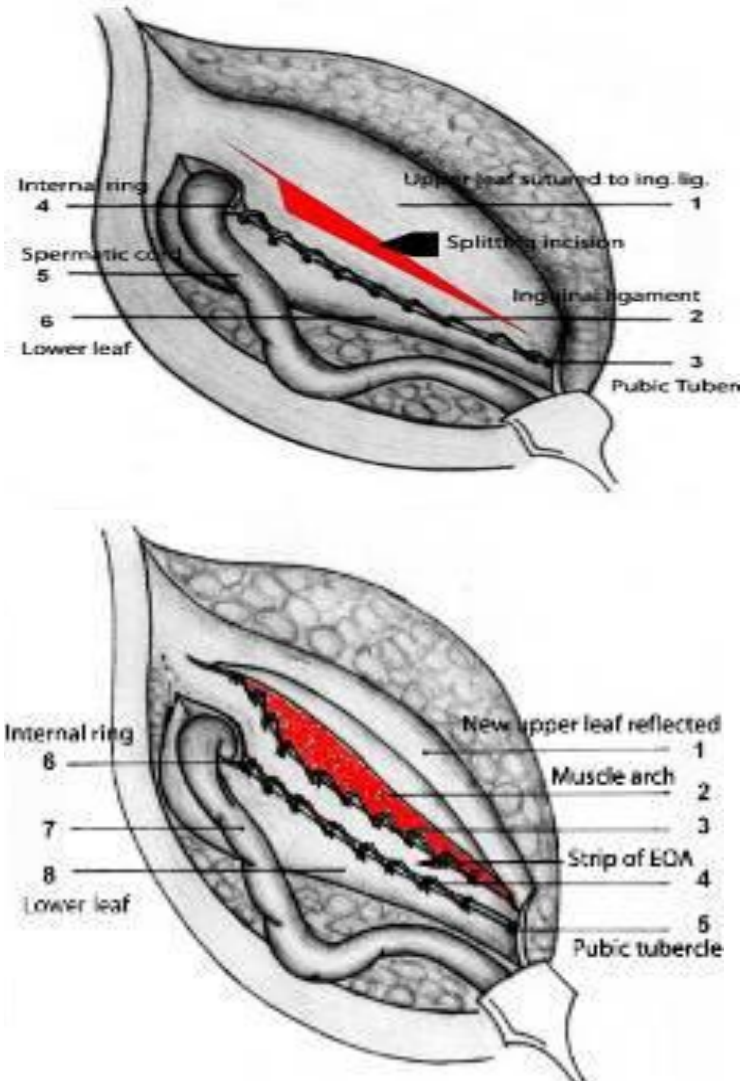
III)McVay's Repair:

- This can be done in both inguinal and femoral hernia where prosthesis is contraindicated



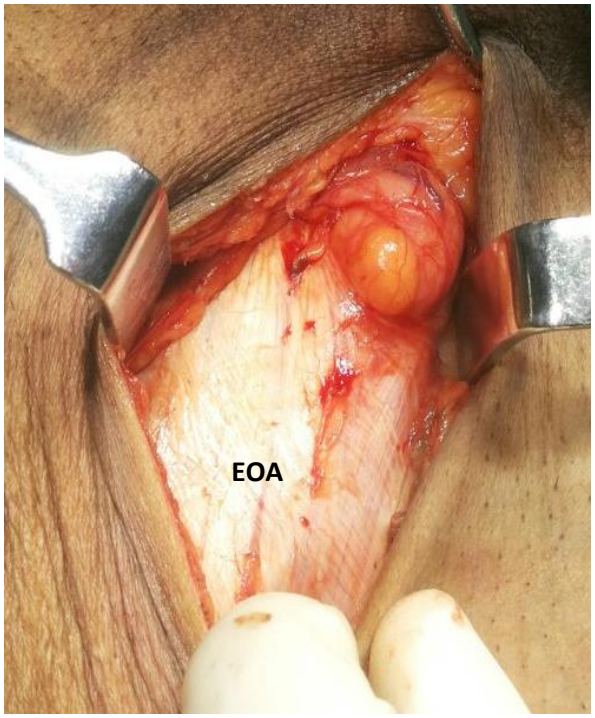
- An incision in the transversalis fascia is made and preperitoneal space is entered.
- The upper flap is raised and Cooper's ligament is bluntly dissected exposing its surface.
- A relaxing incision is made in the anterior rectus sheath above, from the pubic tubercle, which reduce tension on the repair.
- The superior transversalis flap is then sutured to Cooper's ligament, and the repair is continued laterally along Cooper's ligament to occlude the femoral ring.
- Lateral to the femoral ring, a transition stitch is placed, affixing the transversalis fascia to the inguinal ligament. The transversalis is then sutured to the inguinal ligament laterally to the internal ring.
- Recurrence Rate: 19-20% [(16)]

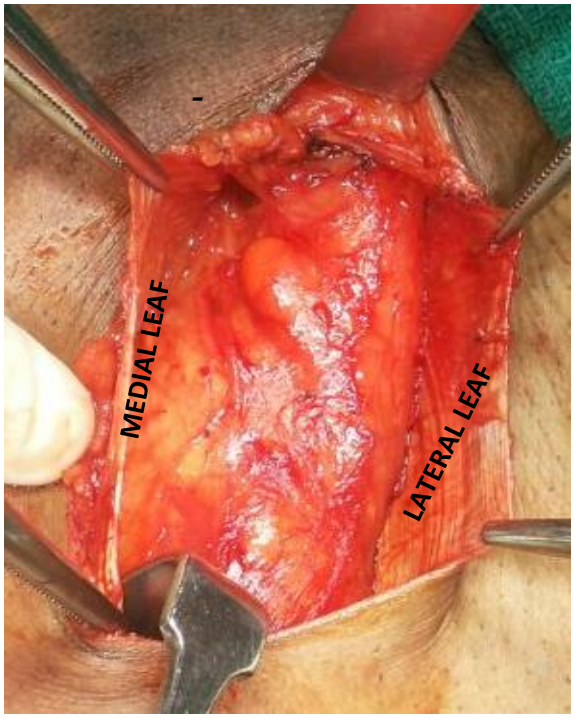
IV)Desarda's no mesh repair:

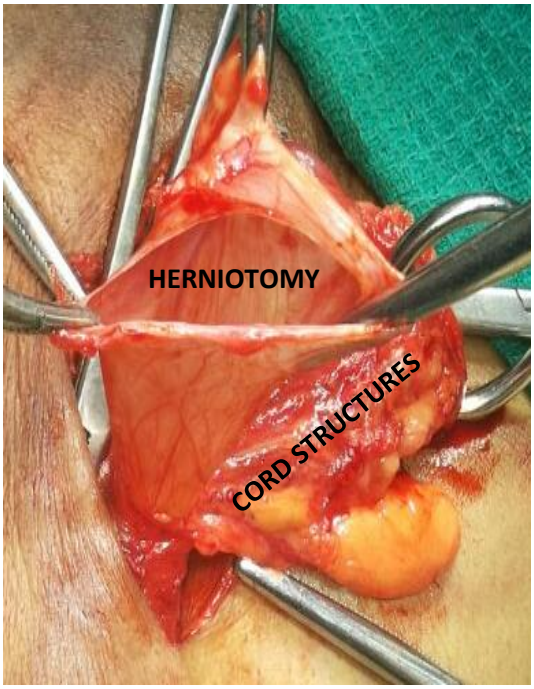


- This is a relatively new method which is based on the concept of providing a strong, mobile and physiologically active posterior abdominal wall [(9)]
- This method was introduced by Prof. Dr.Mohan.P.Desarda at Poona Hospital & Research Centre, Pune.
- The External oblique aponeurosis (EOA) is cut ,the inguinal canal is opened.

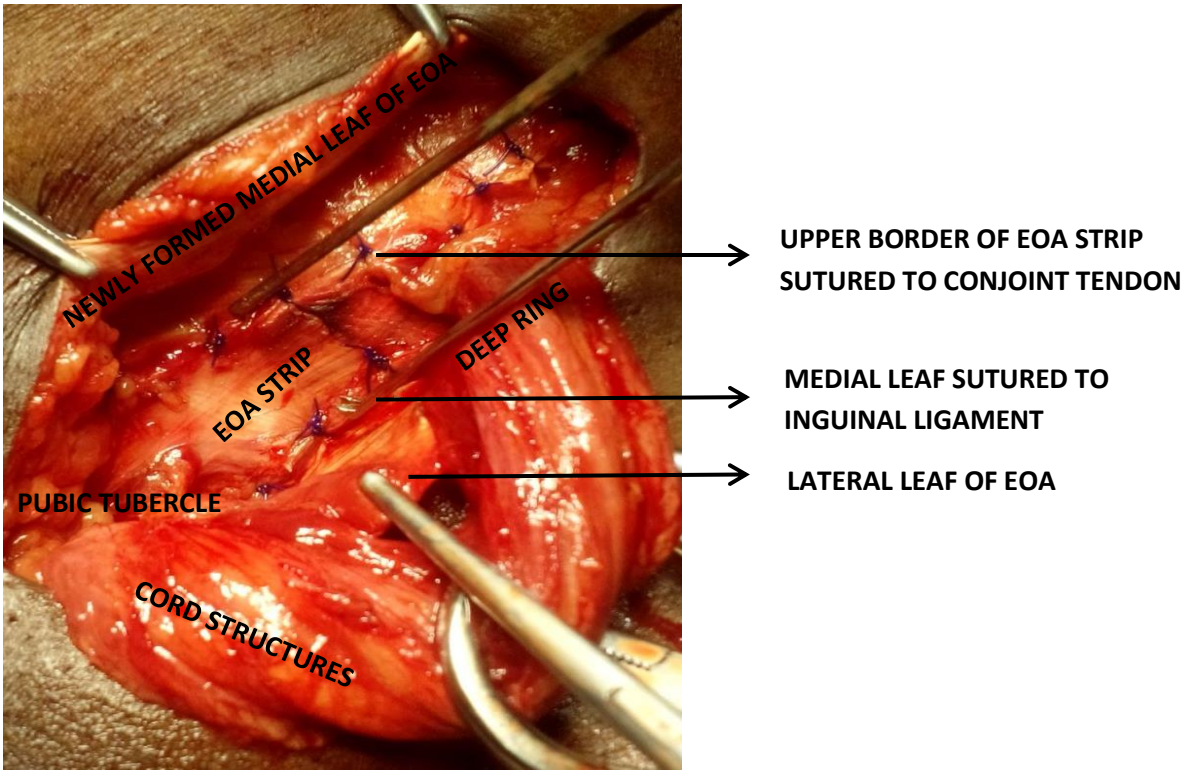
INTRA-OP PICTURES:







- Herniotomy is done



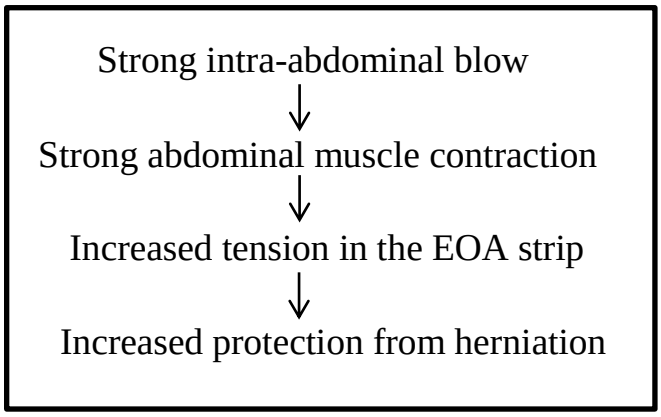
- The medial leaf of the EOA is sutured to the inguinal ligament from the pubic tubercle to the deep ring.
- Sutures are taken to narrow the deep ring but care should be taken not to constrict the spermatic cord.
- A splitting incision is made in the sutured medial leaf and is extended medially up to the rectus sheath and laterally 1-2 cms beyond the deep ring.
- The medial insertion and lateral continuation of this strip is kept intact through which it gets its blood supply.
- The upper free border of the strip is sutured to the conjoint tendon with 2/0 polypropylene interrupted sutures.

- The strip of EOA is placed behind the cord to form a new posterior wall of the inguinal canal.
- The lateral leaf of the EOA is sutured to the newly formed medial leaf of the EOA in front of the cord.

- Undermining of the newly formed medial leaf on both of its surfaceshelps in approximation to the lateral leaf without tension.
- This is followed by closure of the superficial fascia and the skin as usual.

MECHANISM OF ACTION:

- External oblique muscle contraction produces a lateral tension in the strip, whereas internal oblique/conjoined muscle contraction results in a superolateral tension, hence making the strip like a shield which prevents herniation.

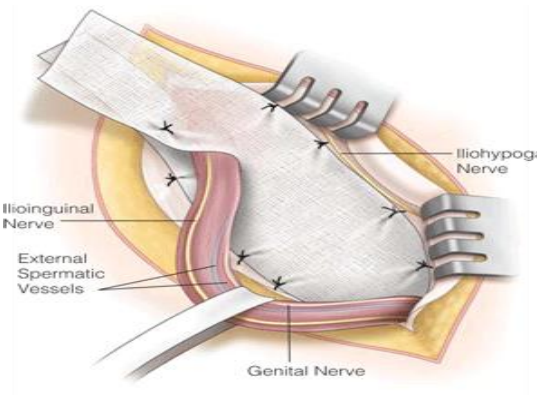


ADVANTAGES:

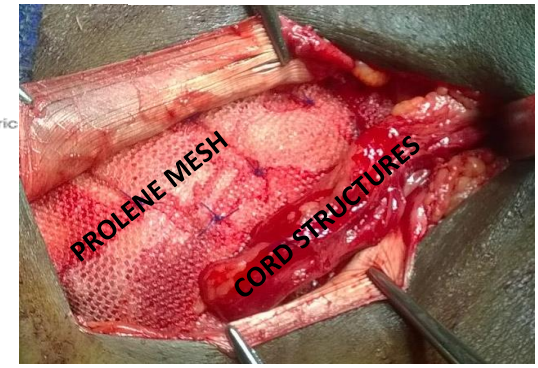
- No suture line tension[9]
- No foreign material
- Simple and easy to do and learn[9]

PROSTHETIC REPAIRS:

I) Lichtenstein's tension free mesh repair



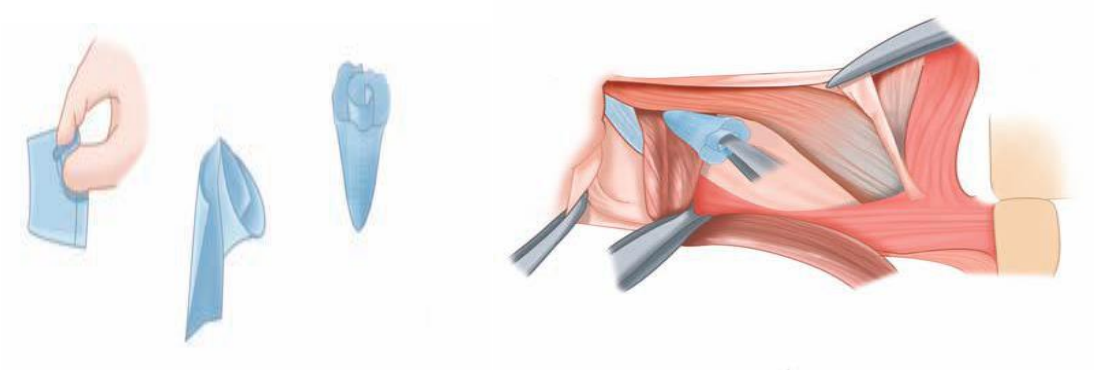
INTRA-OP PICTURE



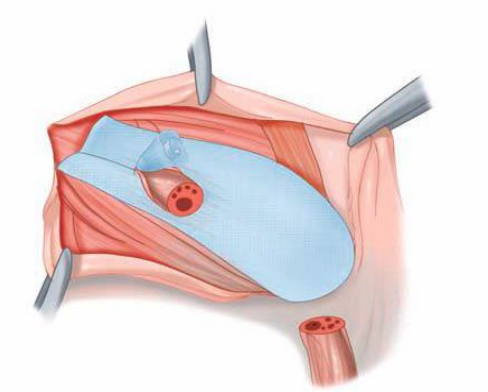
- The Lichtenstein technique is by reinforcing the inguinal floor with a prosthetic mesh, which minimizing tension in the repair.
- The mesh is a 7 × 15 cm rectangle with a rounded medial edge
- It must be large enough to extend 2 to 3 cm superior to Hesselbach's triangle.
- The lateral part of the mesh is split. The superior tail comprises $2/3^{rd}$ of its width, the inferior tail comprises the remaining $1/3^{rd}$.
- The medial edge of the mesh is fixed to the anterior rectus sheath overlapping the pubic tubercle by 1.5 to 2 cm, which minimizes medial recurrence.
- The inferior margin of the mesh is fixed with a permanent, synthetic, monofilament suture , without suturing directly into the pubic tubercle periosteum.

- Fixation is continued along the shelving edge of the inguinal ligament from medial to lateral, ending at the internal ring.
- The upper tail of the mesh is fixed to the internal oblique aponeurosis, the medial edge to the rectus sheath using a permanent, synthetic, monofilament suture.
- Recurrence rate: 1.6% [17]

II) Plug and Patch technique [18]:



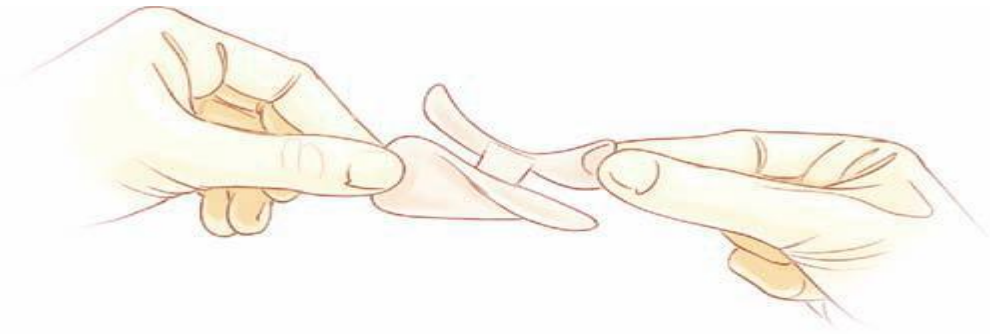
- A plug is created from a flat piece of mesh, or it is preformed and commercially available.
- The plug is placed in the internal ring, which was previously occupied by the hernial sac.



- After the placement of the plug, a prosthetic mesh patch is placed over the inguinal floor, similar to Lichtenstein's technique.
- For direct hernias, the sac is reduced, and the plug sutured to the inguinal ligament, cooper's ligament and the internal oblique aponeurosis.

III) Prolene hernia system:

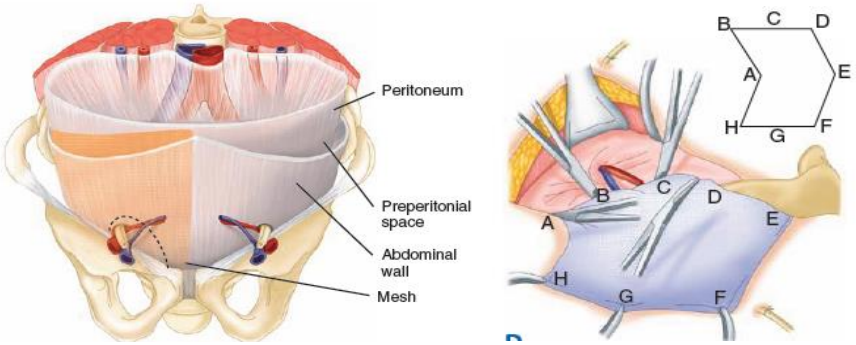
- The Prolene Hernia System (PHS) repair provides reinforcement to the anterior and posterior abdominal wall.
- The mesh consists of an underlay flap and an onlay flap, joined by a short cylindrical connector.



- The underlay portion of the mesh is then placed through the hernia defect into the preperitoneal space.

- Increased intra-abdominal pressure pushes the mesh into close apposition to the abdominal wall. The overlay flap reinforces the inguinal floor similar to a tension-free repair.
- The spermatic cord is placed through a slit over the onlay portion of the mesh.
- 3 to 4 circumferential interrupted sutures anchor the anterior layer of the mesh to the inguinal canal floor.

IV) Giant prosthetic reinforcement of visceral sac:



- Preperitoneal space is created and a broad prosthetic mesh is placed in it.
- 8 - 10cm Pfannenstiel or low transverse incision is made superior to the internal inguinal ring.
- The lateral aspect of rectus sheath and the oblique muscles are divided along the length of the incision.
- The transversalis is incised, and the preperitoneal space is dissected widely till Cooper's ligament medially and over the iliopubic tract laterally to the anterior superior iliac spine.

- A large mesh is used that covers the area from the midline to 1 cm medial to the anterior superior iliac spine and from umbilicus till the pubic symphysis.
- Mesh splitting, to accommodate cord structures, may predispose to hernia recurrence. Mesh may also be fixed to the anterior abdominal wall.
- Recurrence : 4.2% [22]

Drawbacks of Mesh prosthesis:

- Not universally available
- Expensive
- Tendency for the mesh to fold, curl or wrinkle as the groin is a mobile area.

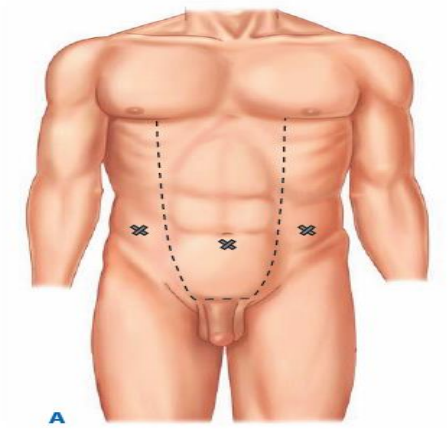
LAPAROSCOPIC APPROACH:

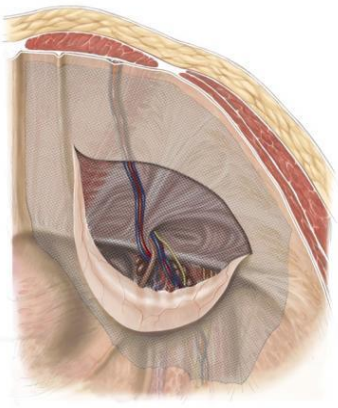
This includes

- Transabdominal preperitoneal (TAPP) repair,
- Totally extraperitoneal (TEP) repair

I) Transabdominal preperitoneal repair:

- The transabdominal approach is intraperitoneal and useful for bilateral hernias, large hernia defects, and scarring from previous lower abdominal surgery.
- An incision is made in the peritoneum near the medial umbilical ligament 3 to 4 cm superior to the hernia defect, which is carried laterally till the anterior superior iliac spine.
- Preperitoneum is cut and opened which exposes the spermatic cord.

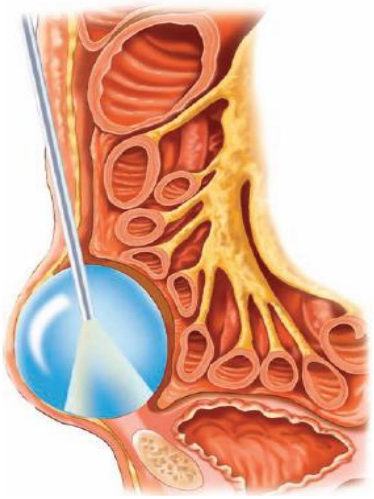




- The mesh usually measures 10 × 15 cm. It is unrolled in thepreperitoneal space and secured medially to Cooper's ligament and laterally to the anterior superior iliac spine.

- The peritoneal edges are reapproximated and closed completely to avoid contact between the mesh and the intestine.
- Recurrence rate : 2.9% [7]

II) Totally Extraperitoneal repair:



- The advantage of the TEP repair is the access to the preperitoneal space without intraperitoneal infiltration.
- This minimizes the risk of injury to intra-abdominal organs and port site herniation through an iatrogenic defect in the abdominal wall.
- Recurrence rate : 3.5% [7]

COMPLICATIONS OF GROIN HERNIA REPAIR:

1. Recurrence
2. Chronic groin pain
3. Cord and testicular
    - Hematoma
    - Ischemic orchitis
    - Testicular atrophy
    - Hydrocele
4. Bladder injury
5. Wound infection
6. Seroma/Hematoma
7. Prosthetic complications: Contraction/Erosion/Infection/Rejection
8. Laparoscopic
    - Vascular injury
    - Visceral injury
    - Trocar site complications
    - Bowel obstruction
9. General
    - Cardiovascular & Respiratory insufficiency
    - Nausea and vomiting
    - Aspiration pneumonia
10. Osteitis pubis

MATERIALS AND METHODS

This study was conducted in Government Mohan Kumaramangalam Medical college hospital, Salem during September 2013 to September 2015.

CASE SELECTION:

The study population consists of patients presenting with inguinal hernia at the General surgery outpatient department, in Government Mohan Kumaramangalam Medical college hospital, Salem.

STUDY DESIGN : Prospective study.

STUDY PERIOD : 2 years (September 2013 to September 2015).

ETHICAL CLEARANCE : Institutional Ethical clearance obtained.

INCLUSION CRITERIA: All patients who present in surgical outpatient department with inguinal hernia :

- Direct
- Indirect
- Pantaloon

EXCLUSION CRITERIA:

- Associated surgical pathologies where the patient was getting operated for both conditions at the same time, laparoscopic repairs or the patientsgiven general anesthesia for any reason.
- Old age with thinned out external oblique aponeurosis.
- Pregnancy
- Children.
- Morbid obesity.
- Bilateral/Recurrent/Complicated inguinal hernia.

METHODS OF COLLECTION OF DATA:

The material for the study was taken from the cases attending the General Surgery OPD of all the units of the Department of General Surgery, Government Mohan Kumaramangalam Medical College & Hospital, who are diagnosed to have inguinal hernia (direct/indirect/pantaloon inguinal hernia). The patients were subjected to detailed clinical history taking and physical examination to confirm the diagnosis and to rule out other systemic diseases.

Patients were randomly subjected to Lichtenstein's tension free mesh repair and Desarda's no mesh technique after obtaining informed consent. All patients were treated with antibiotics and analgesics postoperatively.

The follow up of these patients were done with history regarding symptoms of postoperative complications like pain, Surgical site infection, Scrotal edema etc.,

SAMPLE SIZE:

Among the 60 patients who were diagnosed with inguinal hernia, they were divided into 2 groups

Group I : 30 patients were subjected to Desarda's no mesh repair

Group II : 30 patients were subjected to Lichtenstein's tension free mesh repair.

FOLLOW-UP:

Patients were followed up till discharge, following which they were followed up after 2 weeks, 1 month, 2 months, 6 months, 1 year and 2year

RESULTS AND ANALYSIS

- A total of 60 patients who presented in the outpatient department of General Surgery, with a diagnosis of inguinal hernia during the study period were enrolled in the study.
- The subjects were thoroughly examined and subjected randomly to Desarda's no mesh technique and Lichtenstein's tension free mesh repair
- The outcome of each procedure was assessed during follow up This was summarized into a master chart.
- The collected data was analysed with SPSS 16.0 version.
- To describe about the data descriptive statistics frequency analysis, percentage analysis were used for categorical variables and the mean & S.D were used for continuous variables.
- To find the significant difference between the bivariate samples in Independent groups (Male & Female) Unpaired sample t-test was used. To find the significance in categorical data Chi-Square test was used.
- In both the above statistical tools the probability value .05 is considered as significant level.
- The comparable tabulations permit certain statistical interferences to be made which are presented below.

AGE INCIDENCE:

The age of the patients varied from 19 to 62 years.

Most of the patients belonged to more than 55 years of age.

The following table shows the age distribution in the study group

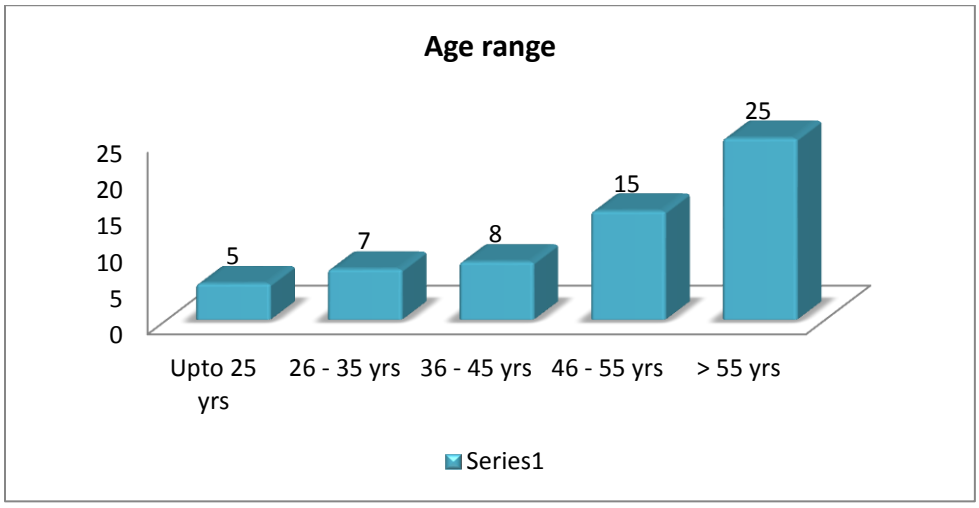
TABLE 01 : DISTRIBUTION OF CASES IN DIFFERENT AGE GROUPS

Age in years	Frequency	Percent
Upto 25 yrs	5	8.3
26 - 35 yrs	7	11.7
36 - 45 yrs	8	13.3
46 - 55 yrs	15	25
> 55 yrs	25	41.7
Total	60	100

P: 0.835

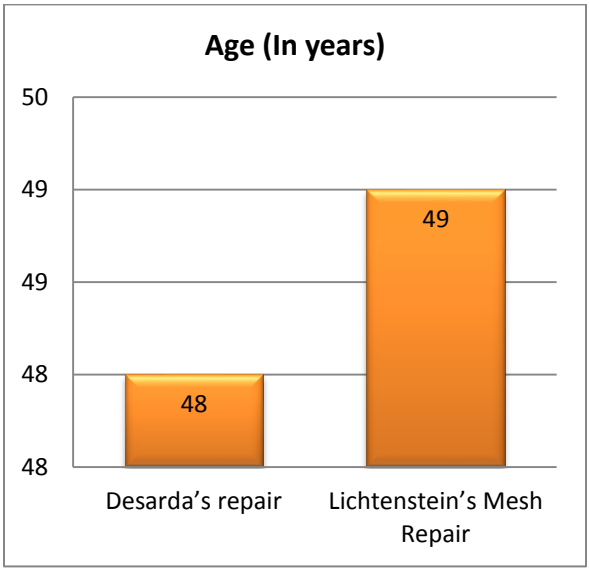
DISTRIBUTION OF CASES IN DIFFERENT AGE GROUPS

FIGURE-01.1



AGE DISTRIBUTION IN EACH STUDY GROUP

FIGURE-01.2



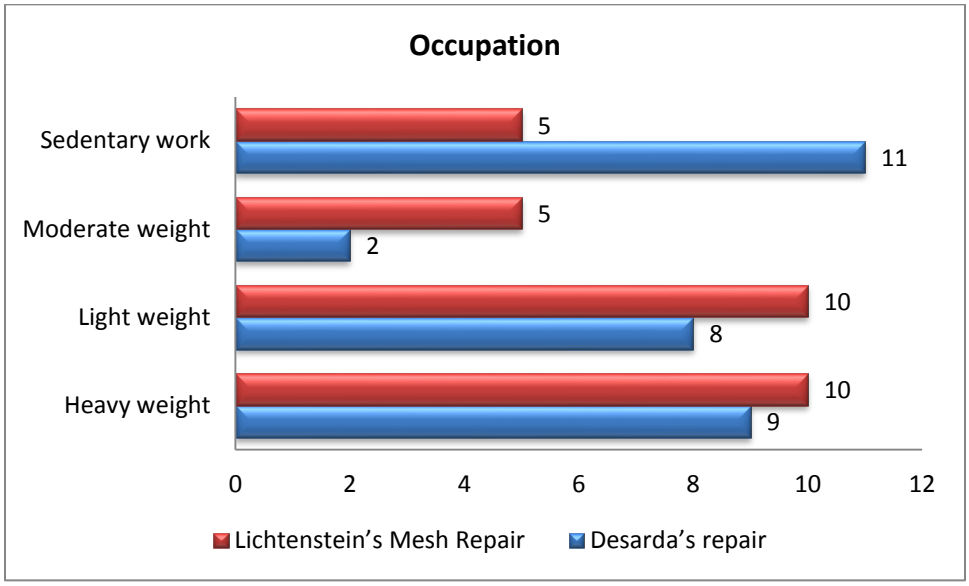
OCCUPATION CATEGORY IN THE STUDY GROUPS

TABLE 02

Occupation	Desarda's repair	Lichtenstein's Mesh Repair
Heavy weight	9	10
Light weight	8	10
Moderate weight	2	5
Sedentary work	11	5

P: 0.28

FIGURE-02



P: 0.283

03. DURATION OF HERNIA:

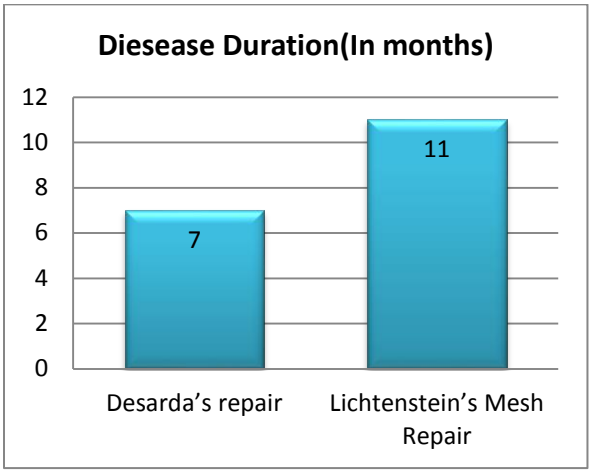
The average duration of the hernia in the group of patients who underwent Desarda's repair was 7 months, whereas in those who underwent Lichensteins mesh repair it was 11 months

TABLE 03

	Diesease Duration(In months)
Desarda's repair	7
Lichtenstein's Mesh Repair	11

P: .000

FIGURE 03



04. TYPE OF HERNIA:

Of the 30 patients who underwent Desarda's repair(DR), 10 (33.3%) patients had direct hernia and 20 (66.7%) patients had indirect hernia.

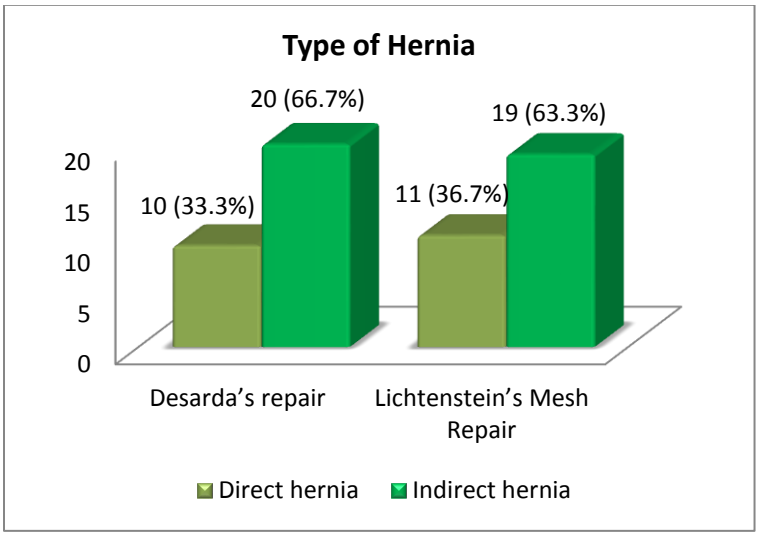
Of the 30 patients who underwent Lichenstein's mesh repair(LMR), 11(36.7%) patients had direct hernia(D) and 19 (63.3%) patients had indirect hernia(id).

TABLE-04

			DR LMR		Total
			Desarda's repair	Lichtenstein's Mesh Repair	
Type	D	Count	10	11	21
		% within DRLMR	33.30%	36.70%	35.00%
	ID	Count	20	19	39
		% within DRLMR	66.7 %	63.3 %	65.00%

P: 0.78

FIGURE-04



05. ASSOCIATION OF COMORBID CONDITIONS:

Comorbidities like COPD, DM, Hypertension, and prostatomegaly were taken into consideration and the findings were tabulated and are as follows

FIGURE - 05

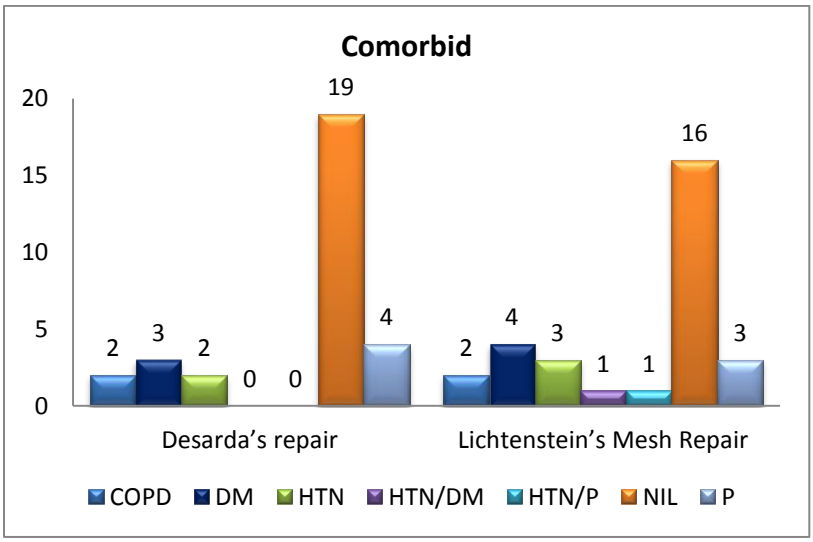


TABLE – 05

			DRLMR		Total
			Desarda's repair	Lichtenstein's Mesh Repair	
Comorbid	COPD	Count	2	2	4
		% within DRLMR	6.70%	6.70%	6.70%
	DM	Count	3	4	7
		% within DRLMR	10.00%	13.30%	11.70%
	HTN	Count	2	3	5
		% within DRLMR	6.70%	10.00%	8.30%
	HTN/DM	Count	0	1	1
		% within DRLMR	0.00%	3.30%	1.70%
	HTN/P	Count	0	1	1
		% within DRLMR	0.00%	3.30%	1.70%
	NIL	Count	19	16	35
		% within DRLMR	63.30%	53.30%	58.30%
	P	Count	4	3	7
		% within DRLMR	13.30%	10.00%	11.70%
Total		Count	30	30	60
		% within DRLMR	100.00%	100.00%	100.00%

P: 0.840

INTRA-OPERATIVE PARAMETERS:

06. TYPE OF ANAESTHESIA:

Out of the 30 patients in the Desarda's group, 5 (16.7%) patients had surgery under Local Anaesthesia, whereas the rest under regional anaesthesia.

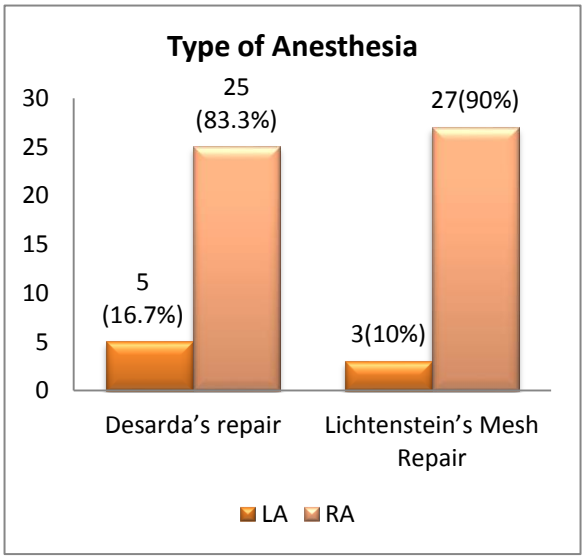
Out of the 30 patients in the Lichensteins group, 3 (10%) had surgery under Local anaesthesia(LA), and the rest under Regional anaesthesia(RA).

TABLE – 06

			DRLMR		
			Desarda's repair	Lichtenstein's Mesh Repair	Total
TOA	LA	Count	5	3	8
		% within DRLMR	16.7%	10.0%	13.3%
	RA	Count	25	27	52
		% within DRLMR	83.3%	90.0%	86.7%
Total		Count	30	30	60
		% within DRLMR	100.0%	100.0%	100.0%

P:0.448

FIGURE – 06



07. DURATION OF SURGERY:

The average duration for Desarda's No mesh repair was 49minutes.

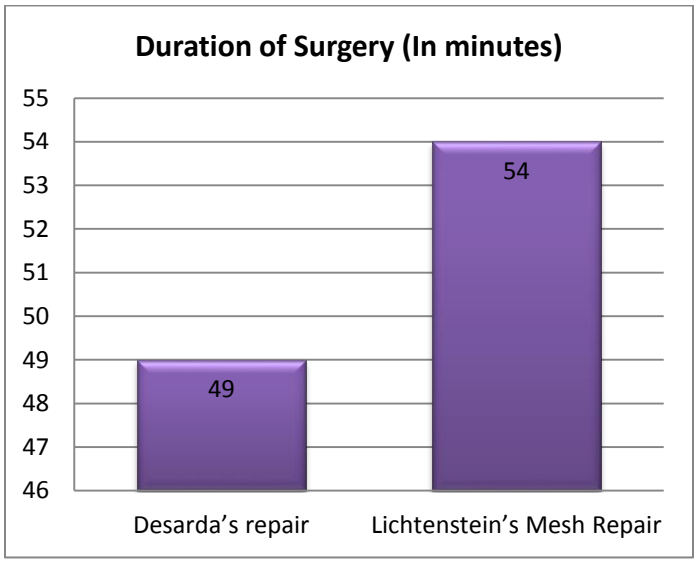
The Average duration for Lichtensteins Mesh repair was 54minutes.

TABLE – 07

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Duration of Surgery (In minutes)	Equal variances assumed	4.879	.031	-4.361	58	.000	-5.433	1.246	-7.927	-2.940
	Equal variances not assumed			-4.361	51.868	.000	-5.433	1.246	-7.933	-2.933

P : 0.000

FIGURE – 07



POSTOPERATIVE PARAMETERS:

08. GROIN PAIN:

Patients from both groups were followed up, and those who had groin pain were noted and the data was tabulated

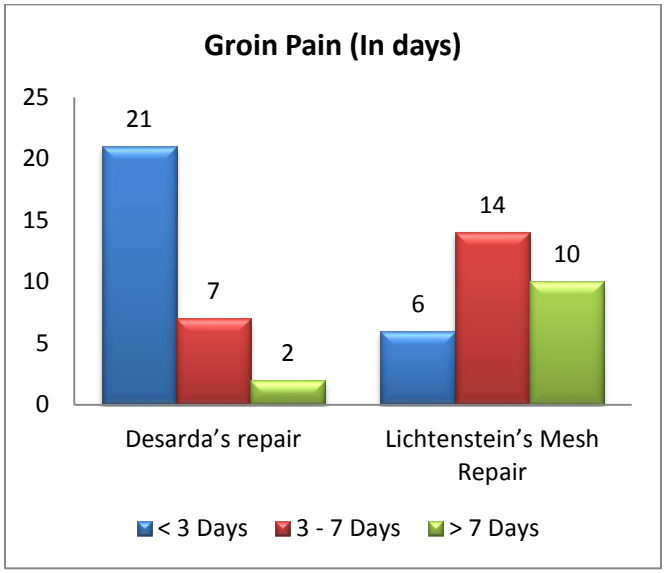
TABLE – 08.1

			DR LMR		Total
			Desarda's repair	Lichtenstein's Mesh Repair	
Groin pain	<3 Days	Count	21	6	27
		% within DRLMR	70.0%	20.0%	45.0%
	3-7 Days	Count	7	14	21
		% within DRLMR	23.3%	46.7%	35.0%
	>7 Days	Count	2	10	12
		% within DRLMR	6.7%	33.3%	20.0%
Total		Count	30	30	60
		% within DRLMR	100.0%	100.0%	100.0%

TABLE – 08.2

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	16.000[a]	2	.000
Likelihood Ratio	17.026	2	.000
Linear-by-Linear Association	14.757	1	.000

FIGURE – 08



09. SURGICAL SITE INFECTIONS (SSI):

During the postoperative period patients who had surgical site infections were identified and graded as grade I according to CDC classification and the results were tabulated.

TABLE – 09

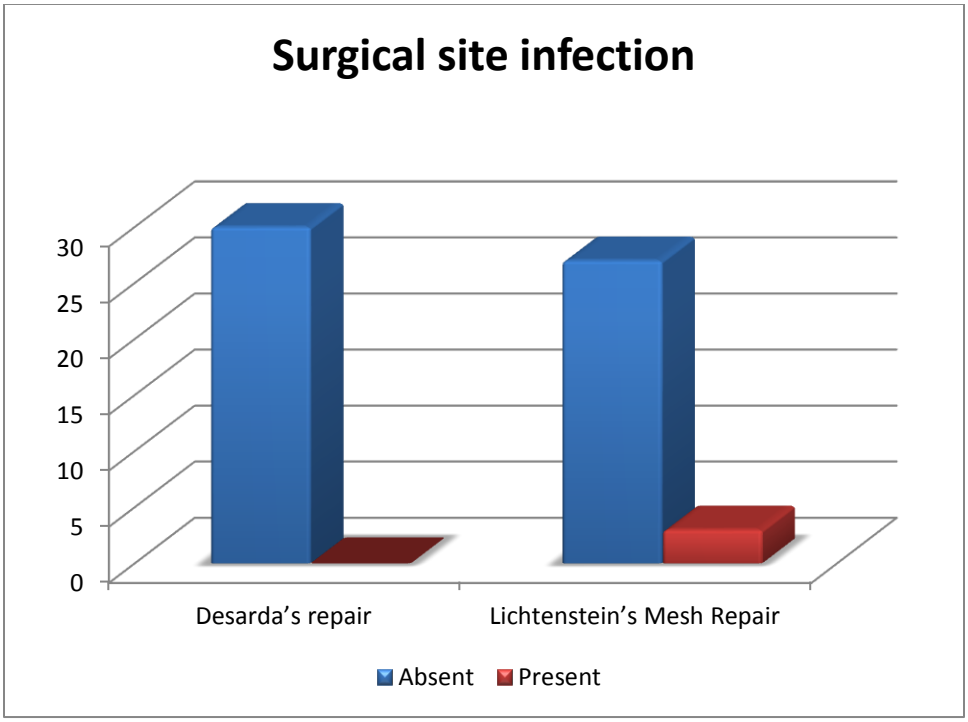
			DR	LMR	Total
			Desarda's repair	Lichtenstein's Mesh Repair	
SSI	Absent	Count	30	27	57
		% within DRLMR	100.0%	90.0%	95.0%
	Present	Count	0	3	3
		% within DRLMR	0.0%	10.0%	5.0%

CHI-SQUARE TEST:

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.158[a]	1	.076
Likelihood Ratio	4.317	1	.038
N of Valid Cases	60		

P : 0.076

FIGURE – 09



10.FOREIGN BODY SENSATION(FBS):

Of the 30 patients who underwent hernia repair by Lichtenstein's technique, 6 (20%) patients complained of foreign body sensation, compared to desarda's technique where there were no such incidences

TABLE-10

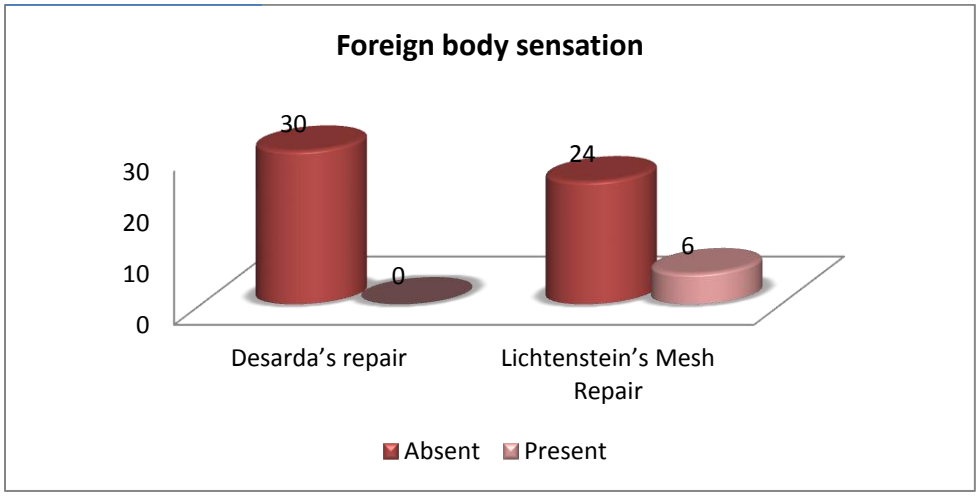
			DR LMR		Total
			Desarda's repair	Lichtenstein's Mesh Repair	
FBS	Absent	Count	30	24	54
		% within DRLMR	100.0%	80.0%	90.0%
	Present	Count	0	6	6
		% within DRLMR	0.0%	20.0%	10.0%

CHI-SQUARE TEST

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.667[a]	1	.010
Likelihood Ratio	8.986	1	.003
N of Valid Cases	60		

P : 010

FIGURE-10



11. ABDOMINAL WALL STIFFNESS(AWS):

Of the 30 patients who underwent Desarda's inguinal hernia repair, none of the patient had abdominal wall stiffness.

Of the 30 patients who underwent Lichtenstein's mesh repair, 7 (23%) had complaints of abdominal wall stiffness.

TABLE-11

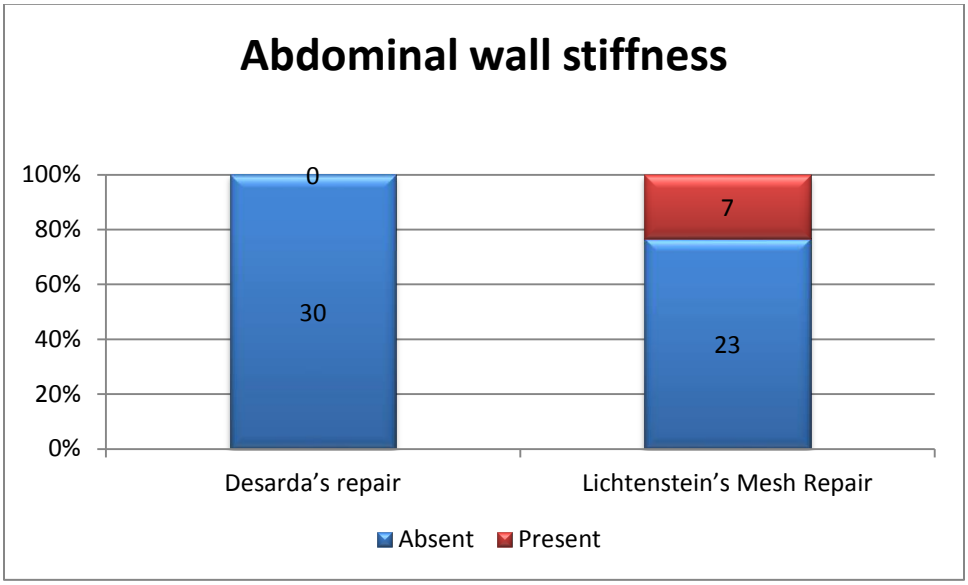
			DRLMR		Total
			Desarda's repair	Lichtenstein's Mesh Repair	
AWS	Absent	Count	30	23	53
		% within DRLMR	100.0%	76.7%	88.3%
	Present	Count	0	7	7
		% within DRLMR	0.0%	23.3%	11.7%

P : 0.005

CHI-SQUARE TEST

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.925[a]	1	.005
Likelihood Ratio	10.631	1	.001
N of Valid Cases	60		

FIGURE – 11



12. LOSS OF SENSATION(LOS) OVER THE GROIN:

The number of patients who had loss of sensation over the abdominal wall were noted and the results were tabulated

TABLE – 12

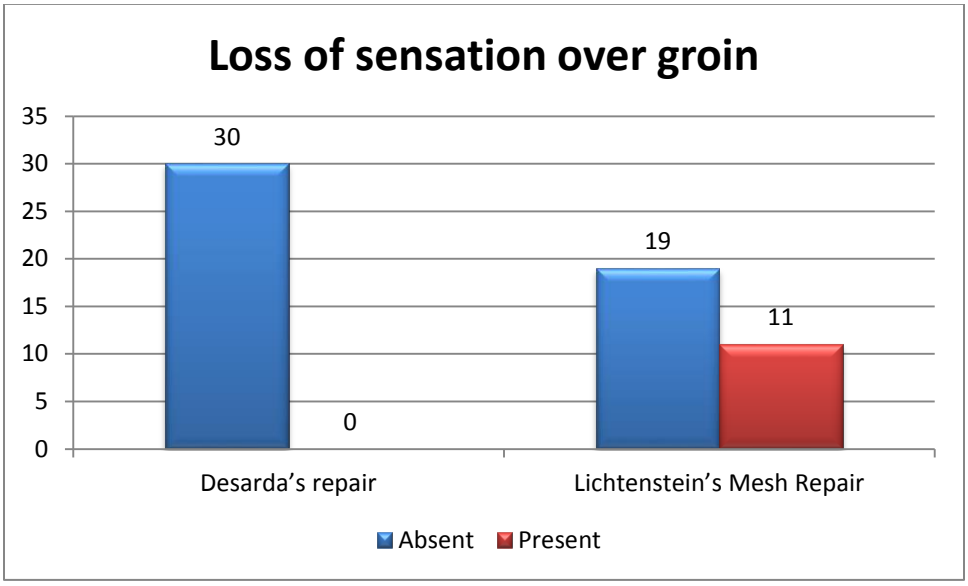
			DR	LMR	Total
			Desarda's repair	Lichtenstein's Mesh Repair	
LOS	Absent	Count	30	19	49
		% within DRLMR	100.0%	63.3%	81.7%
	Present	Count	0	11	11
		% within DRLMR	0.0%	36.7%	18.3%

P : 0.000

CHI-SQUARE TEST

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.469[a]	1	.000
Linear-by-Linear Association	13.245	1	.000
N of Valid Cases	60		

FIGURE – 12



P : 0.000

13. SCROTAL EDEMA (SE) / TESTICULAR ATROPHY (TA):

None of the patients who underwent Desarda's repair had scrotal edema or testicular atrophy.

6 (20%) patients in the Lichtenstein's mesh repair group had scrotal edema, and none had testicular atrophy over a period of 2 year follow up

TABLE – 13

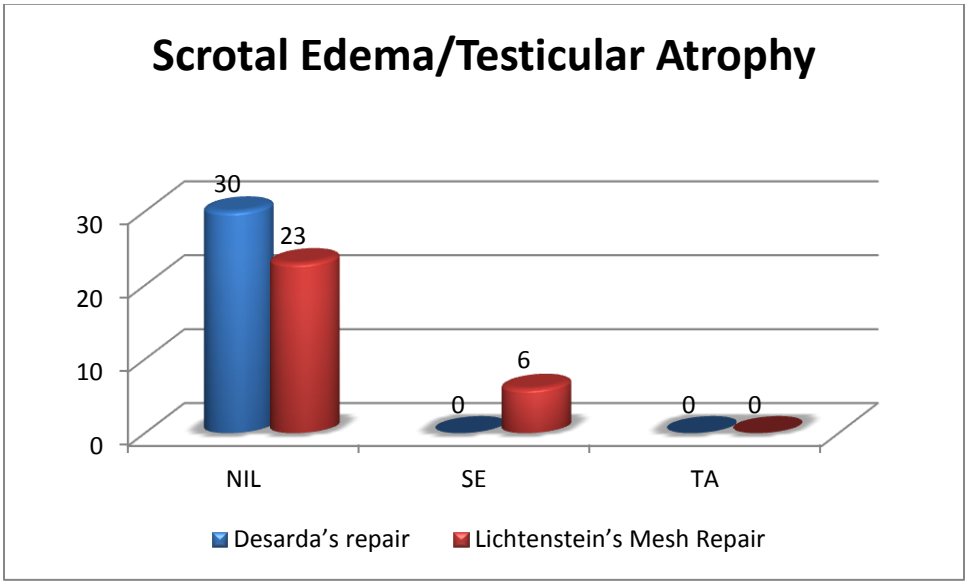
			DRLMR		Total
			Desarda's repair	Lichtenstein's Mesh Repair	
SE/TA	NIL	Count	30	23	53
		% within DRLMR	100.0%	76.7%	88.3%
	SE	Count	0	6	6
		% within DRLMR	0.0%	20.0%	10.0%
	TA	Count	0	0	0
		% within DRLMR	0.0%	0.0%	0.0%

P: 0.019

CHI-SQUARE TEST:

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.925[a]	2	.019
Likelihood Ratio	10.631	2	.005
N of Valid Cases	60		

FIGURE – 13



14. SEROMA (S) / HEMATOMA (H):

- None of the patients in the Desarda's repair group had seroma/hematoma
- 1 patient (3.3%) in the Lichtenstein mesh repair had hematoma, whereas 4 patients (13.3%) had seroma

TABLE-14

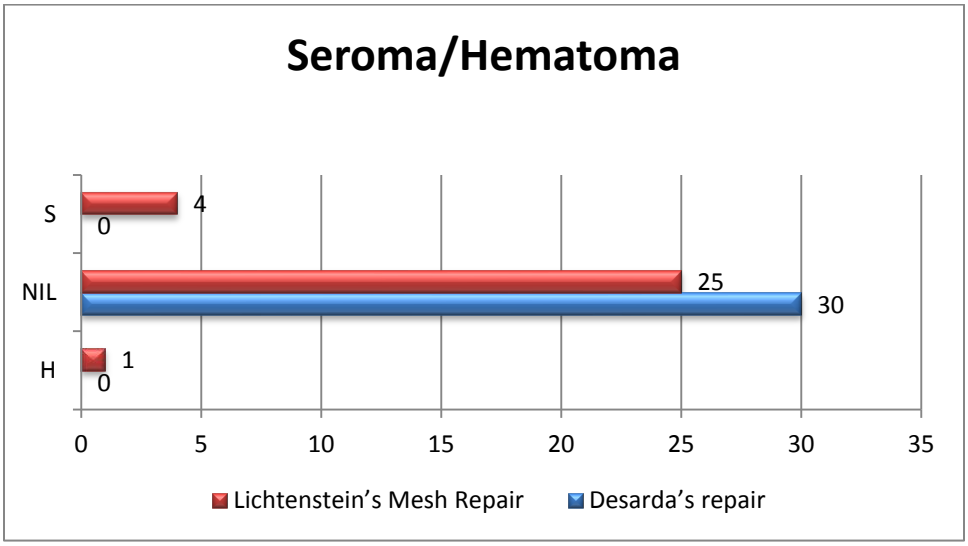
			DR	LMR	
			Desarda's repair	Lichtenstein's Mesh Repair	Total
S/H	H	Count	0	1	1
		% within DRLMR	0.0%	3.3%	1.7%
	NIL	Count	30	25	55
		% within DRLMR	100.0%	83.3%	91.7%
	S	Count	0	4	4
		% within DRLMR	0.0%	13.3%	6.7%

CHI-SQUARE TEST

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.455[a]	2	.065
Likelihood Ratio	7.387	2	.025
N of Valid Cases	60		

P : 0.065

FIGURE – 14



15. DURATION OF HOSPITAL STAY:

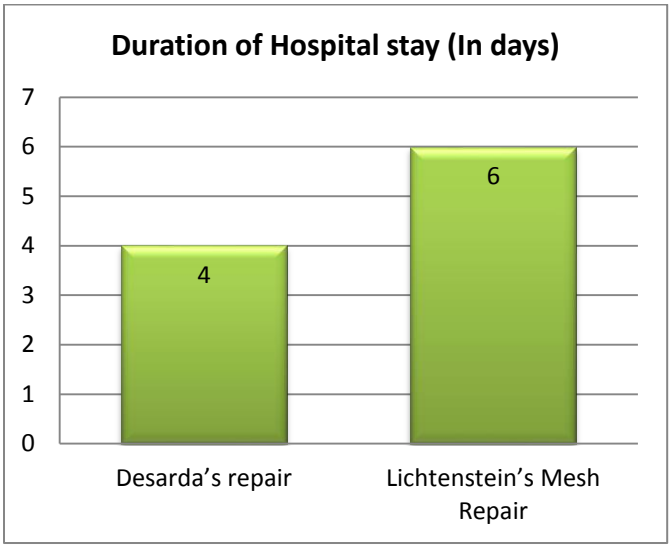
The average duration of hospital stay was 4 days in case of Desarda's repair and 6 days in Lichtenstein's repair

TABLE – 15

	Levene's Test for Equality of Variances		t-test for Equality of Means							
	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
								Lower	Upper	
Hospital stay	Equal variancs assumed	1.325	0.254	-5.007	58	0	-1.7	0.34	-2.38	-1.02
	Equal variances not assumed			-5.007	53.89	0	-1.7	0.34	-2.381	-1.019

P : 0.000

FIGURE – 15



16. RETURN TO NORMAL ACTIVITY (RTNA):

In Desarda's group, the duration to return to normal activity was <7 days in 19(63.3%) patients, 7-15 days in 8(26.7%) patients, >15 days in 3(10%) patients.

In Lichtenstein's group, the duration of return to normal activity was <7 days in 3(10%) patients, 7-15 days in 18(60%) patients, >15 days in 9(30%) patients.

TABLE-16

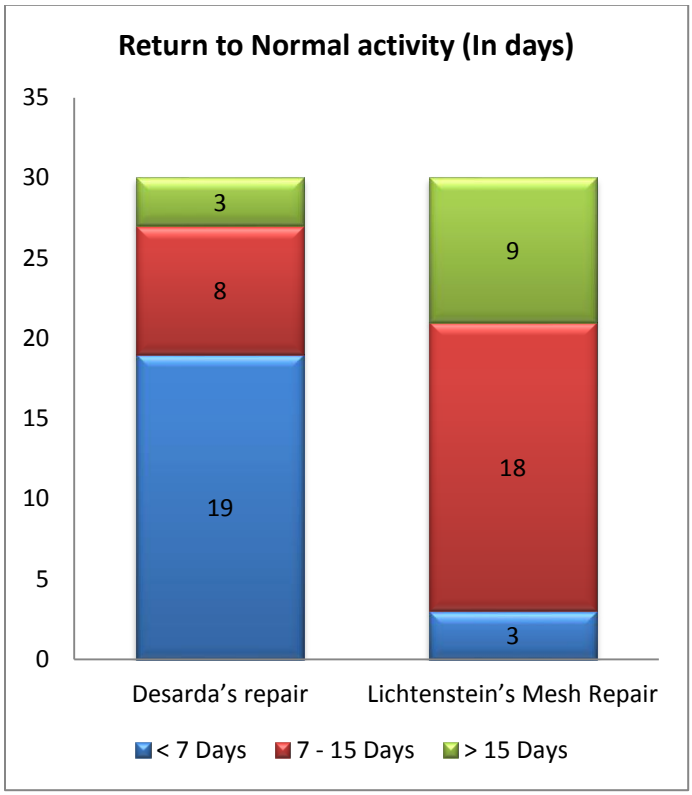
			DRLMR		Total
			Desarda's repair	Lichtenstein's Mesh Repair	
RTNA	< 7 Days	Count	19	3	22
		% within DRLMR	63.3%	10.0%	36.7%
	7 - 15 Days	Count	8	18	26
		% within DRLMR	26.7%	60.0%	43.3%
	> 15 Days	Count	3	9	12
		% within DRLMR	10.0%	30.0%	20.0%

CHI-SQUARE TEST

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.483[a]	2	.000
Likelihood Ratio	20.060	2	.000
N of Valid Cases	60		

P : 0.000

FIGURE – 16



17. RECURRENCES:

There were no recurrences in both the groups during a two year follow up.

DISCUSSION:

Inguinal hernia is a very common condition afflicting mankind [5].

A physiologically weak posterior inguinal canal wall is the main cause of inguinal hernia in most of the patients. Hence the main goal of hernia repair should be focused at providing a strong, mobile and physiologically active posterior wall of the inguinal canal [8].

Mesh repair is now commonly used and is most often referred to as the gold standard technique [10]. But this surgery is associated with complications like chronic groin pain, seroma, and rarely testicular atrophy, mostly in the hands of less experienced junior surgeons. Mesh is more expensive and is not available in many parts of the country. Though mesh acts like a mechanical barrier, it does not provide a mobile and dynamic posterior wall [9].

Standard tissue repairs like Shouldice, Bassini also require expertise and are associated with tension in the repaired tissue [8].

Hence this study compares Desarda technique which is a relatively simple tissue repair, does not require a foreign body like mesh, cost effective, with minimal complications [8], with Lichtenstein's tension free mesh repair. This method satisfies the rule of 'No tension', as well as provides a physiologically sound, dynamic posterior wall of inguinal canal [7].

As the aging process is minimum in the tendons and aponeurosis, a strip of the external oblique, which is tendo-aponeurotic, is the best alternative to the mesh, which is used in Desarda's technique [9].

In this study, incidence of inguinal hernia was highest in the 4th decade with a mean age of 48. The average duration of hernia in Desarda's technique was 7 months whereas in Lichtenstein's technique it was 11 months.

Various studies show that Desarda's technique is associated with lesser duration of surgery, and lesser post op complications like groin pain, abdominal wall stiffness, duration of hospital stay and time to return to normal activity [7, 8, 10, and 12].

In this study, the average duration for Desarda's No mesh repair was 49minutes, whereas the average duration for Lichtenstein's Mesh repair was 54minutes

Groin pain has been found to be due to fibrous reaction to foreign body in case of mesh repair, leading to spermatic cord and nerve enmeshment [5], which affects the quality of life of the patient. Desarda's technique being a pure tissue repair, and hence no fibrous reaction to produce groin pain. In our study, patients were classified into those who had groin pain for < 3 days, 3-7 days, >7 days. 70% of the patients in the desarda group experienced pain only for less than 3 days whereas 46.7% and 33.3% of the patients in Lichtenstein's method had pain for 3-7days and more than 7 days respectively.

Surgical site infection was higher in Mesh repair (10%) when compared to Desarda's technique (0%).

Foreign body sensation and loss of sensation was present only in Lichtenstein's mesh repair group.

According to Desarda et al, the average duration that was needed for the patients to return to work in the Desarda's group was 8.26 days whereas it was 12.58 days in the Lichtenstein group. In our study most of the people (63.3%) in the Desarda's group returned to normal activity within 7 days, when compared to Lichtenstein's group where the patients (60%) returned to normal activity within 7-15 days

Desarda et al showed a recurrence of 1.97%, but it was observed during a 10year follow-up.

But in this study both the groups had no recurrences during 2 year follow-up which indicates the necessity for a large scale and long term follow-up to identify recurrences if any.

CONCLUSION:

- Desarda's technique is easy to learn and simple when compared to other tissue repair techniques and this requires no mesh.
- It is physiologically sound.
- It can be performed under local anesthesia when patient is unfit for Regional/General anesthesia.
- It is associated with less duration of surgery, less mesh related complications in the postoperative period and there is early return to normal activity.
- It can be used in a contaminated surgical field, in young individuals and in cases of financial constraints.
- Hence, Desarda's no mesh repair is favorably comparable with Lichtenstein's mesh repair
- To conclude Desarda's no mesh repair, when compared to Lichtenstein's mesh repair produces same or better results.
- Large scale study and Long term follow up may be required to identify the recurrent cases.

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PATIENT CONSENT FORM

STUDY TITLE:

"**COMPARATIVE STUDY OF LICHENSTEIN'S MESH REPAIR AND DESARDA'S NO-MESH REPAIR FOR INGUINAL HERNIA, IN GMKMCH, SALEM"**

Department of General surgery, GMKMCH

PARTICIPANT NAME: AGE : SEX: I.P. NO :

I confirm that I have understood the purpose of surgical/invasive procedure for the above study. I have the opportunity to ask the question and all my questions and doubts have been answered to my satisfaction.

I have been explained about the possible complications that may occur during and after medical/ surgical procedure. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving any reason.

I understand that investigator, regulatory authorities and the ethics committee will not need my permission to look at my health records both in respect to the current study and any further research that may be conducted in relation to it, even if I withdraw from the study. I understand that my identity will not be

revealed in any information released to third parties or published, unless as required under the law. I agree not to restrict the use of any data or results that arise from the study.

I hereby consent to participate in this study for various surgical/invasive procedures and their outcomes.

All of the above was explained to me in my own vernacular language.

Time :

Date : Signature / Thumb Impression Of Patient

Place : Patient's name:

Signature of the investigator: _____

Name of the investigator : _____

நோயாளி ஒப்புதல் படிவம்

தலைப்பு: "குடலிறக்க அறுவைசிகிச்சை முறையின் Lichentstein mesh repair ஐயும், Desarda's no mesh repairஐயும் ஒப்பிடும்ஆய்வு, அரசு மோகன் குமாரமங்கலம் மருத்துவ கல்லூரி மற்றும் மருத்துவமனை, சேலம்"

பொது அறுவைசிகிச்சை துறை

நோயாளியின் பெயர்: வயது: ஆண்/பெண்

மரு.எண்:

எனக்கு இந்த அறுவைசிகிச்சையின் நோக்கம், மற்றும் அதன் செயல்முறை அனைத்தும் நன்கு புரிந்தது என உறுதி அளிக்கிறேன். எனக்கு அறுவைசிகிச்சை பற்றிய சந்தேகங்களை கேட்க வாய்ப்பு அளிக்கப்பட்டது எனவும் , அவ்வாறு கேட்கப்பட்ட பொழுது, சந்தேகங்கள் யாவும் எனக்கு தெளிவாக எடுத்துரைக்கப்பட்டது எனவும் தெரிவிக்கிறேன்.

அறுவைசிகிச்சையின் பொழுதும் அதன் பின்னரும் ஏற்பட வாய்ப்புள்ள பின்விழைவுகள் யாவும் எனக்கு தெளிவாக எடுத்துரைக்கப்பட்டது. மேலும் இந்த ஆய்வில் நான் எனது சொந்த விருப்பத்தின் பெயரில் பங்களிக்கிறேன் என்பதனையும், தேவைப்பட்டால் எந்த விளக்கமும் அளிக்காமல் ஆய்வில் இருந்து என்னால் விலகிக்கொள்ள முடியும் என்பதனையும் நான் நன்கு அறிவேன்.

மேலும், எனது உடல்நல பதிவேடுகளை இந்த ஆய்வுக்கோ, பிற்காலத்தில் இந்த ஆய்வு தொடர்பான மற்ற ஆய்வுகளுக்கோ

பயன்படுத்திக்கொள்ள, ஆய்வாளருக்கோ, கட்டுப்பாட்டு அதிகாரிக்கோ, நெறிமுறை குழுவினருக்கோ எனது சம்மதம் தேவையில்லை என்பதனையும் நான் நன்கு அறிவேன். என்னைப்பற்றிய விவரங்களையும் அடையாளத்தையும் சட்ட வலியுறுத்தல் இல்லாமல் மூன்றாம் தரப்பினருக்கு வெளியிட முடியாது என்பதனையும் நான் அறிவேன். இந்த ஆய்வின் வழியாக வரும் எந்த முடிவுகளையும் வெளியிடுவதற்கு நான் தடையாக இருக்க மாட்டேன் என உறுதி அளிக்கிறேன்.\

இதன்மூலம் இந்த ஆய்வில் பங்கேற்கவும், ஆய்வில் செய்யப்படும் அருவைசிகிச்சைக்கும் முழுமனதுடன் சம்மதம் அளிக்கிறேன்.

மேற்கூறிய யாவும் எனக்கு நன்கு புரியும் எனது தாய்மொழியில் எனக்கு எடுத்துரைக்கப்பட்டது.

நேரம்: நோயாளியின் கையொப்பம்

நாள் நோயாளியின் பெயர்

இடம் : சேலம்

ஆய்வாளரின் கையொப்பம்

ஆய்வாளரின் பெயர்

PROFORMA

"COMPARATIVE STUDY OF LICHENSTEIN'S MESH REPAIR AND DESARDA'S NO-MESH REPAIR FOR INGUINAL HERNIA IN GMKMCH, SALEM"

INGUINAL HERNIA

Name :

Address :

Age/sex :

RELIGION :

O.PNo :

I.P No :

D.O.A :

TIME & DATE OF OPERATION :

D.O.Discharge :

CHIEF COMPLAINTS :

PAST HISTORY:

1. DM : Yes/ No
2. TB : Yes/ No
3. EPILEPSY
4. MALARIA
5. PREVIOUS SURGERY
6. JAUNDICE
7. CIRRHOSIS

PERSONAL HISTORY

SMOKER

ALCOHOLIC

INITIAL ASSESSMENT OF PATIENT:

1.Vitals:

PR :

BP :

RR :

Temperature :

2.GENERAL SIGNS:

Pallor

Tongue

Skin

Icterus

Cyanosis

Lymphadenopathy:

ASSESSMENT OF INGUINAL SWELLINGS:

INSPECTION:

i) Side of swelling:

ii) Extent:

iii) Shape:

iv)Surface:

v) Margin:

vi) Skin over the swelling:

PALPATION

1. Temperature
2. Tenderness
3. Consistency
4. Get above the swelling
5. Inspectory findings : confirmed
6. Impulse on coughing:
7. Ziemans test
8. Finger invagination test
9. Deep ring occlusion test

PERCUSSION

AUSCULTATION

Bowel sounds

ABDOMINAL MUSCLE TONE:

EXTERNAL GENITALIA:

PER RECTAL EXAMINATION:

SYSTEMIC EXAMINATION:

CVS:

RS:

CNS:

MUSCULO SKELETAL SYSTEM:

CLINICAL DIAGNOSIS:

INVESTIGATIONS:

A. HB%:

B. GROUPING & TYPING:

C. BT/CT:

D. PCV:

E. HBSAg : HIV:

F. ECG:

G. URINE: Macro:

Micro :

Albumin:

Sugar:

H. BLOOD: RBS:

BLOOD UREA:

SER.CREATININE

I. CHEST X RAY PA VIEW:

J. ABDOMEN & PELVIS USG:

PRE-OPERATIVE DIAGNOSIS:

OPERATIVE PROCEDURE:

ANESTHESIA:

INCISION:

SURGICAL PROCEDURE:

- **Duration of surgery:**
- **Duration of hospital stay:**
- **Ambulation:**

POST-OPERATIVE PERIOD / COMPLICATIONS:

A. Chronic groin pain:

B. Surgical site infections:

C. Foreign body sensation:

D. Abdominal wall stiffness:

E. Loss of sensation over the groin

F. Seroma/Hemotma

G. Testicular atrophy:

H. Recurrence:

OUTCOME OF THE TREATMENT:

Method: Lichenstein's mesh repair

FOLLOW-UP IMPROVEMENT OF SYMPTOMS HEALING

2^{nd} week:

4th week:

2^{nd} month:

6^{th} month:

1^{st} year

2^{nd} year:

Method: Desarda's no mesh repair

FOLLOW-UP IMPROVEMENT OF SYMPTOMS HEALING

2^{nd} week:

4th week:

2^{nd} month:

6^{th} month:

1^{st} year

2^{nd} year:

MASTER CHART

S. No	Name	Age	Sex	Ip.no	Occ	HERNIA			Comorbid	Surgery			POST OP									Rec
						DOH	Type	Side		TOA	TOS	DOS	GP	SSI	FBS	AWS	LOS	SE/ TA	S/ H	DOHS	RTNA	
1.	POMMAIYA	55	M	1147	LW	5	ID	L	COPD	LA	DR	48	I	-	-	-	-	-	-	3	A	-
2.	ARUMUGAM	58	M	2305	HW	8	ID	R	-	RA	DR	45	I	-	-	-	-	-	-	5	B	-
3.	DESIGAM	43	M	3783	SW	7	ID	L	-	RA	DR	47	I	-	-	-	-	-	-	3	A	-
4.	GANESAN	60	M	2967	LW	9	D	R	HTN	RA	DR	43	II	-	-	-	-	-	-	4	A	-
5.	MUTHU	31	M	3903	HW	4	ID	R	-	RA	DR	45	I	-	-	-	-	-	-	4	A	-
6.	MADESWARAN	47	M	3767	HW	8	ID	R	P	RA	DR	49	I	-	-	-	-	-	-	4	A	-
7.	AZHAGENDRAN	45	M	3899	HW	6	ID	R	-	RA	DR	52	II	-	-	-	-	-	-	5	B	-
8.	RAMASAMY	54	M	3769	SW	7	ID	R	HTN	RA	DR	51	I	-	-	-	-	-	-	4	A	-
9.	MADHU	50	M	4991	SW	11	ID	L	-	RA	DR	48	I	-	-	-	-	-	-	4	A	-
10	VADIVEL	60	M	6467	MW	8	D	R	COPD	LA	DR	52	III	-	-	-	-	-	-	7	C	-
11.	BALU	48	M	6531	SW	9	ID	L	-	RA	DR	48	I	-	-	-	-	-	-	5	B	-
12.	MARIYAPPAN	60	M	19073	LW	6	D	R	DM	RA	DR	48	I	-	-	-	-	-	-	4	A	-
13.	AJITH	19	M	13091	SW	5	ID	R	-	RA	DR	43	II	-	-	-	-	-	-	5	A	-
14.	DHANAPAL	59	M	30752	LW	10	D	R	-	LA	DR	55	I	-	-	-	-	-	-	3	A	-
15.	MANOKARAN	33	M	10995	SW	7	ID	R	-	RA	DR	54	I	-	-	-	-	-	-	4	B	-
16.	MANI	52	M	12131	HW	5	ID	R	-	RA	DR	58	II	-	-	-	-	-	-	6	B	-
17.	JAGANATHAN	57	M	11589	MW	9	D	R	-	RA	DR	56	II	-	-	-	-	-	-	5	B	-
18.	RAJENDRAN	55	M	12137	SW	8	ID	R	-	RA	DR	45	I	-	-	-	-	-	-	3	A	-
19.	BHASKAR	48	M	34094	HW	5	ID	R	P	RA	DR	48	I	-	-	-	-	-	-	4	A	-
20.	RAJENDRAN	40	M	13487	HW	6	ID	L	-	RA	DR	52	I	-	-	-	-	-	-	4	A	-
21.	BALU	60	M	15851	LW	7	D	L	-	LA	DR	50	I	-	-	-	-	-	-	3	A	-
22.	ABDUL NAZEER	60	M	53794	LW	12	D	L	P	RA	DR	51	I	-	-	-	-	-	-	5	A	-
23.	MURUGESAN	20	M	17087	SW	4	ID	L	-	RA	DR	48	I	-	-	-	-	-	-	4	B	-
24.	YUVARAJ	50	M	19053	HW	5	ID	R	-	RA	DR	41	III	-	-	-	-	-	-	7	C	-
25.	MANIKANDAN	27	M	44364	SW	8	ID	R	-	RA	DR	46	I	-	-	-	-	-	-	3	A	-
26.	PALANISAMY	62	M	19021	HW	10	D	R	DM	LA	DR	48	II	-	-	-	-	-	-	5	C	-
27.	LAKSHMANAN	45	M	65374	SW	5	ID	L	DM	RA	DR	52	I	-	-	-	-	-	-	5	A	-
28.	SEKAR	31	M	66384	LW	9	ID	R	-	RA	DR	50	I	-	-	-	-	-	-	3	A	-
29.	PONNUSAMY	60	M	63170	LW	8	D	R	P	RA	DR	48	II	-	-	-	-	-	-	5	B	-
30.	KRISHNAN	53	M	22037	SW	7	D	L	-	RA	DR	48	I	-	-	-	-	-	-	3	A	-

MASTER CHART

S. N	Name	Age	Sex	Ip.no	Occ	HERNIA			Comorbid	Surgery			POST-OP									Rec
						DOH	Type	Side		TOA	TOS	DOS	GP	SSI	FBS	AWS	LOS	SE/ TA	S/ H	DOHS	RTNA	
31.	SRIDHAR	19	M	14605	LW	12	ID	L	-	RA	LMR	48	I	-	-	-	+	-	-	5	B	-
32.	PALANIYAPPAN	58	M	13865	HW	8	D	L	HTN	RA	LMR	57	II	-	+	+	-	SE	-	7	C	-
33.	ANANDAN	24	M	15237	HW	9	ID	L	-	RA	LMR	49	II	-	-	-	-	-	-	5	B	-
34.	RAJU	24	M	15869	MW	11	ID	R	-	RA	LMR	57	I	-	-	-	-	-	-	5	A	-
35.	SADAIYAN	57	M	57230	HW	7	D	R	-	RA	LMR	46	II	-	-	-	+	-	S	7	C	-
36.	SIVAGAMI	60	F	17351	LW	10	D	L	HTN	RA	LMR	48	III	-	-	+	-	-	-	7	B	-
37.	MANICKAM	55	M	17923	SW	8	ID	R	-	RA	LMR	45	II	-	-	-	-	-	-	5	B	-
38.	SENRAYAN	54	M	18546	MW	12	D	L	COPD	RA	LMR	49	II	-	-	+	+	-	-	5	B	-
39.	SELVARAJ	45	M	18599	HW	7	ID	R	-	RA	LMR	47	III	-	+	-	-	-	-	5	B	-
40.	REVATHI	45	F	20788	SW	9	ID	L	DM	RA	LMR	56	II	-	-	-	-	-	-	6	B	-
41.	JAYAPAL	60	M	75976	HW	8	D	R	HTN/P	RA	LMR	57	II	-	-	-	+	-	S	6	C	-
42.	MUNIYAPPAN	54	M	75984	SW	12	ID	R	-	RA	LMR	59	II	-	-	-	-	-	-	7	B	-
43.	RAVI	47	M	21317	LW	9	ID	R	-	RA	LMR	68	III	-	-	-	-	-	-	8	B	-
44.	KARUPPAN	60	M	22517	HW	12	D	R	P	LA	LMR	57	III	+	+	-	+	SE	H	10	C	-
45.	PANNEER	34	M	86376	LW	18	ID	R	-	RA	LMR	54	I	-	-	-	-	-	-	4	A	-
46.	VADIVEL	60	M	24325	LW	13	D	L	P	RA	LMR	52	III	-	+	-	+	SE	-	8	C	-
47.	RANGASAMY	58	M	24793	MW	17	D	R	-	RA	LMR	53	III	-	-	-	-	-	-	5	B	-
48.	SENGODAN	58	M	91760	LW	8	ID	R	DM	LA	LMR	54	II	+	-	-	+	-	-	6	B	-
49.	SELVARAJ	36	M	26087	SW	10	ID	R	DM	RA	LMR	46	I	-	-	+	-	-	-	5	B	-
50.	PANDIYAN	47	M	26697	HW	7	ID	R	HTN	RA	LMR	59	II	-	-	-	-	-	-	5	B	-
51.	KAMATCHI	57	F	27381	HW	19	D	R	-	RA	LMR	62	III	-	-	-	-	-	-	5	C	-
52.	VELAYUTHAM	59	M	28659	HW	18	ID	R	-	RA	LMR	61	III	+	+	+	+	SE	S	10	C	-
53.	BOOPATHI	42	M	29147	MW	12	ID	R	-	RA	LMR	58	III	-	-	-	+	-	-	5	B	-
54.	CHENNIYAPAN	60	M	29129	LW	7	D	L	DM	RA	LMR	49	II	-	-	-	-	-	-	5	B	-
55.	MOHD SAIF	59	M	29671	SW	10	ID	R	HTN/DM	LA	LMR	57	II	-	-	+	+	-	-	6	B	-
56.	KANNAN	57	M	29149	MW	11	ID	R	-	RA	LMR	53	II	-	-	-	-	SE	-	5	C	-
57.	ANNAMALAI	60	M	8795	LW	17	ID	R	P	RA	LMR	58	III	-	-	-	-	-	-	5	B	-
58.	MANIKANDAN	27	M	44364	L W	8	D	R	-	RA	LMR	60	I	-	-	-	+	-	-	6	B	-
59.	ABITH	60	M	14737	HW	12	ID	L	COPD	RA	LMR	54	II	-	+	+	-	SE	S	7	C	-
60.	RAJA	27	M	12547	LW	11	ID	R	-	RA	LMR	59	I	-	-	-	-	-	-	5	A	-

ABBREVIATIONS USED IN MASTER CHART:

1. Age : In years

2. Sex : M- Male

   F-Female

3. Occ : Occupation SW : Sedentary work

   LW : Light weight work

   MW : Moderate weight work

   HW : Heavy weight work

4. DOH : Duration of Hernia (In months)

5. Type : D – Direct hernia
   ID – Indirect hernia

6. Side : L : Left
   R: Right

7. Comorbid	:	Comorbidities	HTN	: Hypertension
			DM	: Diabetes Mellitus
			COPD	: Chronic obstructive pulmonary disease
			P	: Prostatomegaly Grade I
8. TOA	:	Type of anaesthesia	RA	: Regional Anaesthesia
			LA	: Local Anaesthesia
9. TOS	:	Type of Surgery	DR	: Desarda's repair
			LMR	: Lichtenstein's Mesh Repair
10.DOS	:	Duration of surgery (In minutes)		
11.GP	:	Groin Pain	I	: <3 Days
			II	: 3-7 Days
			III	: >7 Days
12.SSI	:	Surgical site infection		

13.FBS	:	Foreign body sensation			
14.SE/TA	:	Scrotal Edema/Testicular Atrophy			
15.LOS	:	Loss of sensation over groin			
16.AWS	:	Abdominal wall stiffness			
17.DOHS	:	Duration of hospital stay (In days)			
18.S/H	:	Seroma/Hematoma			
19.RTNA	:	Return to Normal activity (In days)	A	:	<7 DAYS
			B	:	7-15 DAYS
			C	:	>15 DAYS
20.Rec	:	Recurrences			
21.+	:	Present			
22.-	:	Absent			